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THE WILSON ORNITHOLOGICAL CLUB

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THE WILSON BULLETIN

A QUARTERLY MAGAZINE OF ORNITHOLOGY

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Vol. XLVIII DECEMBER, 1936 No. 4

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FALL AND WINTER BEHAVIOR OF MOCKINGBIRDS

BY AMELIA R. LASKEY

The unique habit among Mockingbirds (*Mimus p. polyglottos*) in Tennessee of choosing territory in autumn, their extraordinary song performance, and their behavior during that period, were described only briefly in previous papers on color banded birds observed at the banding station. There are two reasons for this, the most important one being that the garden had been occupied for several years by the birds which furnished such interesting data for the studies. Both of the males, designated as *B* and *Y*, had already established their claims to territory at the banding station when research by means of colored bands was started in 1932. Also on account of obscuring vegetation in early autumn, it is much more difficult then than in early spring, when trees are bare and leaf growth sparse, to identify birds by their bands and to determine the source of calls and songs. Thus it took a longer period of time to gather data and to piece together the bits that gave an understanding of what was taking place.

In a previously published paper ("A Territory and Mating Study of Mockingbirds", *Migrant*, September, 1933) a description was given of the defense of winter territory and the spring song and courtship performance of *B* and *Y* in 1933. The second paper ("Mockingbird Life History Studies", *Auk*, October, 1935) was a continuation of the history of the same individuals, correlating the singing of the males with the nesting cycle and showing the effects of temperature variations on the spring singing. Individual characteristics of the two males were described. The songs and behavior in 1934, when both remated early with their respective mates of 1933, were contrasted with the performance of the previous year. Nesting data for two seasons were given for both pairs. Some conclusions were reached relative to Mockingbird migration movements here, based on observations of banded birds at the home station and at other points in Nashville.

Almost 400 Mockingbirds have been banded during a period of about four and a half years. Three substations are operated at the

homes of friends; one four miles southwest, one three miles northwest, and the other almost a mile southwest. In addition, observations of banded individuals have been made at two homes in the more closely built section of town nearer the business district.

For sight identification, colored bands were used in addition to the numbered aluminum Biological Survey bands on all Mockingbirds except the fall transients. At first only one colored band was used, the male being banded on the right tarsus and his mate with the same color on the left tarsus. The pair banded with blue were called *B* and *Bf*, the yellow banded pair became *Y* and *Yf*. However, as the numbers of birds and size of areas studied increased, it became necessary to use combinations of two colors. Three bands were placed on one leg and three letter designations indicated the position, thus *GAG* is banded with two green bands with the aluminum band between them.

TABLE 1. Record of the individuals mentioned in this paper.

Name	Sex	Date Banded	Place	Last Seen	Status
B*	♂	Aug. 27, 1931	Home station	March, 1935	Permanent resident
Bf	♀	April 14, 1933	Home station	Dec., 1935	Permanent resident
Y†	♂	Oct. 12, 1931	Home station	June, 1934	Permanent resident
Yf	♀	April 16, 1933	Home station	July, 1934	Sum. res. (2 sea.)
L	♂	Sept. 15, 1933	Home station	Feb., 1936	Permanent resident
ABA**	♂	May 8, 1935	75 yds. N. E.		Permanent resident
R2	♂	Nov. 30, 1934	Home station	Jan., 1936	?
AA	♂	May 29, 1935	300 yds. south	Now home station occupant	
GAG	?	Sept. 2, 1935	Home station	March, 1936	?
AYG	♂	July 11, 1935	90 yds. N. E.	June, 1936	?
BAB	♂	March 29, 1936	Home station	April, 1936	?
R	?	Nov. 8, 1932	Home station	March, 1933	Winter resident
X	♀?	Nov. 1, 1934	Home station	March, 1935	Winter resident
YAY	♀	March 31, 1936	Home station	Now home station occupant	

**B* and *Bf* mated 1933 and 1934. The 1935 courtship in progress when *B* disappeared.

***ABA* was then joined by *Bf* from March, 1935, to August, 1935.

†*Y* and *Yf* mated 1933 and 1934. She migrated for the winter.

Other known females have been color banded but are not included in this table as they appeared only one nesting season and did not winter here.

During midsummer of 1935, for the first time since banding activities began in 1931, the situation seemed to indicate that it might be possible to observe an entirely new group of territory occupants in the fall at the home station. *Y* had been found dead in June, 1934; *B* had presumably fallen victim to a predator in March, 1935, soon after rejoining *Bf* for the third mating; *Bf* had left immediately to mate with *ABA* at a neighbor's about seventy-five yards northeast. The territory vacated by the *B's* was immediately monopolized by *L* and his mate but they had left after their first brood fledged and then

nested about 150 yards south. Their departure in May, 1935, had left one young male *R2* in possession of the front section where *L* had wintered in 1933-34. *R2* did not win a mate until late May, and at the end of June when her chicks were about ten days old, she and her family mysteriously disappeared. *R2* still frequented the station until July 10 but was not found in the neighborhood during midsummer.

Much as the disappearance of *B* was regretted, the new season was awaited with much interest for it seemed the desired opportunity was at hand to see territory selection and defense from its beginning.

Mockingbirds have a marked preference for the habitat of man and nearly all suburban and country homes are chosen by one or more of these sprightly songsters as a suitable place to rear a family. Particularly in the fall is it noticeable how territories are chosen close to dwellings in this area. The food supply is an important item of consideration.

Our lot, located one mile beyond the city limits and five miles from the central business section of Nashville, has a north frontage of 200 feet and is 300 feet deep. It is bordered on the sides and rear by dense clumps of shrubbery, trees, and vines, and across the front, by a clipped hedge. The vine covered house has foundation plantings of shrubs at front and sides and a group of young hackberry trees at its rear. In front of the house and at the extreme rear of the lot are lawns. Inside the shrub and tree borders are informal plantings of flowers and a small pool. Dividing the lot is a "wet weather" creek that goes dry in summer. With the exception of a few old silver maples and numerous young hackberries, all plantings have been made within the past nine years and with the aim of attracting birds to the garden. Fruit bearing trees, shrubs, and vines were used, including wild and cultivated cherry, peach, plum, and apple trees, amoor river privet, lonicera, dogwood, pyracanthus, nandina, bittersweet, rose vines, and others, which, with the popular hackberries, furnish food and nesting places. Although this section is changing rapidly through real estate projects, there is still considerable vacant property adjacent to the banding station, but most of it is cut over at least twice in summer and burned in spring. This vacant property contains old maples, hackberries, and some underbrush along the creeks with a few blackberry and elderberry bushes. In addition to the natural food thus provided, a halved apple or two are placed daily where the pieces may be seen easily. In season fresh pokeberries are kept in and near the traps. Water in summer, suet, and small quantities of raisins and dried pokeberries in winter are also provided. It will be seen that

the banding station offers little more than a very favorable natural setting and background for Mockingbird study. In other words, the amount of food provided is not in such quantity that it would create an abnormal situation by attracting unusually large numbers of this species.

Each year there has been a rhythmic rise and fall in numbers of Mockingbirds at the station which may be illustrated by Table 2.

TABLE 2. Showing number of Mockingbirds banded at Home Station.

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1932	0	0	1	0	1 im.	1 im. 1 ad.	0	3	4	0	1	0
1933	0	0	2	3	3 im.	5 im. 5 ad.	1 im.	36	41	0	0	0
1934	0	0	0	0	4 im.	1 im. 4 ad.	1 im.	3	7	2	2	0
1935	0	0	0	1	2 ad.	4 im.	2 im. 2 ad.	7	30	9	0	0
Total 4 yrs...	0	0	3	4	10	21	6	49	82	11	3	0

This table shows the relative number of new arrivals at the home station with one exception. In August and September, 1934, the frequent rains and lush vegetation made trapping difficult and the low figure of banded birds that year does not give a true picture of their relative abundance that autumn.

In studying this table, it must be kept in mind that there were at least two, but usually more, residents at or adjacent to the banding station each year until midsummer of 1935. In an indirect way, this table therefore illustrates the relative degree of pugnacity displayed by these residents in defending territory. The low number of transients banded after early October is significant because there are still large numbers moving about elsewhere in fall. Resident birds then reassert their claims to territory and are very active in driving away all visitors. This pugnacity is strong throughout the winter and early spring when they are particularly vigilant in guarding definite areas where they feed, roost, and begin their spring singing and courtship.

During the months of December through February of the four-year period tabulated, it will be noted that no birds were banded, because there were three or four resident individuals each winter, holding territory at the station or extending into the station, the boundaries of which they defended with much zeal. The seven birds banded in March and April all proved to be females which came when there were unmated males advertising themselves by loud and

persistent singing. In May, June, and July of this same period, there were twenty-three nestlings and young birds banded and only fourteen adults. Some of those adults are known to have been birds breeding in the neighborhood, and who came for food for themselves and their young.

August, September, and the first few days of October are remarkable for the numbers of visiting groups of birds in which immature plumage and gray eyes predominate, although it has been difficult to determine the ages of some individuals. During the fall period of 1932-1935, the number banded was 142, a sharp increase. During this period adult Mockingbirds are molting and residents are inconspicuous. However by the end of September, the molt is almost complete and visitors are no longer allowed the freedom of the banding station. They are scolded, pursued, and sometimes fought by those that had previously held territory there and by prospective territory holders. Therefore in October, it is seldom that a new Mockingbird is allowed to get into a trap. But transients are still numerous for a month longer in the Nashville area as proven by observations and banding at the substations.

After June in 1935, no nest was built in or immediately adjacent to the garden although Mockingbirds continue nesting activities into August here and young had been banded from about twenty nests in this section during July and August that year. On July 26, the *L's* brought two full-grown chicks to the station for a day or two and on August 14, *L* again visited the garden with some "whining" young. At that time the pokeberries, elderberries, redtwigged dogwood berries, peaches, and plums were ripening and also attracted *Bf* with her chicks. An unmated male, *AA*, that had been singing until late summer and very often at night, came at least once from his territory 300 yards southeast.

On September 7, 1935, a group of four or five started the fall influx of transients which begin to arrive each year about that time or a little earlier. These groups, composed mostly of young birds, flew about, pursuing each other and giving staccato calls that sound somewhat like *chi-chi-chick* and can be imitated by smacking the tongue against the roof of the mouth. In addition, sharp *chucks*, a warning *whe-u*, and an occasional harsh *chy-uk* were prevailing sounds from all sides. Occasionally a bird with flight feathers still partially sheathed would be seen perching, squatting on a limb, or feeding, which usually proved to be an old bird. It is very unusual to hear a song in August or early September although there are home station

records in 1933 for August 21, 25, and the days following. At dusk in the latter part of this period the loud *chucks* became common again as the birds settled for the night separately in dense roosting places of shrub or vine. These relayed answering *chucks* from near and far in every direction are typical of fall and winter as the chill of evening darkness envelopes the out of doors.

On September 11, 1935, it was with much surprise *R2* was found entrapped on the front lawn. His wing and tail feathers were still partially sheathed. On the 18th, a moderate toned song came from the shrubbery where he perched low. His tail was still short. That was the first of the daily concerts by him and others through the lovely warm days of September. The pokeberry patch in the middle west border of the lot was the center of activity those days; almost daily more unbanded birds appeared. On the 18th, a new singer, with some of the exuberance of the mating season, sang loud and fast as he performed some of the actions that had previously been observed only in spring when a female stopped near territory of an unmated male. This new arrival sometimes flew while singing and several times ran with spreading wings into tree forks or flew into shrubs in song. Once he tried to pull off a twig, but when it did not break, he made no further effort to break off others. His song included imitations of a Martin, a Catbird, and a Towhee. He chased other Mockingbirds from the station. He was trapped and his plumage indicated he was a young bird. Although he stayed several days, his performance lacked the zeal of that first day and his songs became shorter and moderate toned like those of *R2*. Continuing through September, the garden was lively with Mockingbirds feeding on pokeberries and privet berries, flying in little pursuits, giving the smacking sounds and *chucks*, and singing lovely songs interspersed with imitations of other birds. *L* was often seen then as he sat on a low limb of the big maple above the pokeberries, quiet and undemonstrative. Often he flew down into the meadow beyond for insects.

The chill evening of September 28 brought the first real waves or relays of "good night" *chucks* at dusk, giving the listener an idea of the number roosting nearby, although the attempt to locate *L's* roost was unsuccessful. Apparently he never participated. On the 30th, he dropped his indifferent attitude and began to chase several species of birds from the pokeberries although the crop was abundant and he ate them only sparingly. He used the characteristic *chuck* and the staccato *chi-chi-chick* calls when chasing the birds. His plumage appeared complete except for the outer pair of rectrices which were still

short. He stayed in the rear half of the lot and mostly on the west side. *R2* spent his time on the front section where privet berries and orange fruit of the pyracanthus bush furnished food. Both spent much time catching moths and other insect food on the lawns. Although *R2* had comparatively few visitors in his section, he was seen chasing birds September 30.

October 1 was an interesting day for *L* sang his first song of the autumn. He started with a few harsh notes which brought to mind similar short metallic sounding songs heard other years in October from resident birds. It was with much surprise *Bf*, in 1934, had been heard repeatedly using it on her own territory, furnishing the first record here of a female Mockingbird song. *L's* song did not stop with the few harsh notes but he sang at length in pleasing melody, alternating moderate tones with very soft notes. He also became more aggressive then toward all birds coming to the pokeberries or to the water near them. All flew away at his approach except a Flicker later in the day that stopped on a branch near him. *L* made a movement toward the larger bird but stopped suddenly, faced him, and puffed out his feathers. When the Flicker ignored him, there were no further signs of hostility, both remained quietly perching and were soon joined by a Cardinal that was allowed to remain only a few feet away in the same tree. On this day (October 1, 1935) *Bf* was located on the rear of the lot but in the east border directly opposite *L's* favorite perch above the pokeberries. She was in a bittersweet vine which proved to be a favorite spot to her while the berries lasted. She was in full new plumage but was rather difficult to locate being rather quiet and frequenting a densely leaved thicket. But on October 4, as she concealed herself in the bittersweet foliage, she provided a delightful surprise—a lovely whisper song—the first Tennessee record of a female singing other than the rather harsh fall song of three or four notes. It was a lengthy song and the performance was repeated many times during the first half of October, affording numerous opportunities to listen, although it took much time and patience to identify her bands. On October 6 for the first time in the 1935 fall season, she was heard giving the very short metallic song just mentioned. This will be called the territory song because it was associated with the early manifestations of territory defense. It seemed like a proclamation of vested interests and it was noted in the days that followed that each occupant of neighboring territory used it and it was relayed at times by several individuals. Excepting the territory song, the singing of this old female bird was not like that of *L* or *R2*. It was always

the muted type, a whispering of call notes of her own species, interspersed with notes of other birds and all uttered in the suppressed manner of the Catbird's song. One note says: "The song of *Bf* began with a series of soft *whe-us*, then many variations of whistles, a few notes like the Towhee, and some like a Canary or a Goldfinch." Many of her songs could be recognized as alarm notes but in this rendition, the effect was always as pleasing as the softest strains of a violin.

During the early part of October, *L* also sang some whisper songs but *R2* was never heard to sing that type. They both gave imitations of other birds.

Once more, as in previous years, the advent of October disclosed the banding station divided into territories. The three occupants that announced and defended their respective areas were all former residents of the garden! It was no longer possible to trap Mockingbirds at the home station. The only one that did succeed in making a landing came in on October 18 while several hundred Bronzed Grackles monopolized the front lawn and distracted the attention of *L* and *R2* for a brief time. When the grackles rose in flight, *R2* was discovered on top of a small trap, worrying the imprisoned intruder. After the first few days of October there were no more visiting Mockingbirds or other species feeding among the pokeberries for they were driven off before even a hurried meal could be snatched. Many were flying about elsewhere and numbers were being trapped at the Green Hills substation less than a mile southwest. Among those trapped there were two Mockingbirds banded earlier that fall at the home station, two returns from previous years, one immature bird that had been banded at its nest July, 1935, about three and one-half miles north. Forty-two Mockingbirds were banded there between the 2nd and the 17th of October. Why were the fruit-laden bushes at the home station no longer being visited when the few bunches of berries placed in and around the two or three small traps at the substation were attracting numbers of Mockingbirds as well as others? Subsequent observations indicated a systematic campaign in which each of the eight or ten resident Mockingbirds in the neighborhood had a definite part and which diverted arrivals before they could alight on the feeding grounds of territory holders. At that time, in addition to the songs, which in the case of *L* and *R2* had become more zealous and louder by the middle of October, sharp *chuck* calls, numerous variations of harsh squawks sounding like *chy-uk* and a gutteral *che-ar* were given. The smacking *chi-chi-chick* calls were most frequently heard and they usually seemed to be a call to alertness. When a bird in the garden

used it, the others became attentive, turned in the direction of the call, answered, and were ready to fly at an intruder if one appeared coming to their boundaries. Sometimes it was not possible to determine what caused the first call but it was very obvious that the answers were given in response. These answers were often in kind but they also included the numerous variations of *chuck* calls, and the others described. Often the alarm was given when a Mockingbird was seen flying over, the other residents each answered while flying to the boundary line nearest the intruder, either waiting there to head off the visitor or going to the assistance of the resident of adjoining territory to chase this unwelcome bird who always changed his course suddenly. As he disappeared in the distance, other alarms were heard from that direction where doubtless he was treated similarly in territories already occupied.

After October 15, *Bf* had discontinued her interesting whisper songs and she had retreated from the bittersweet vines (then denuded of fruit) to a small thicket containing some fruiting hackberry trees on vacant property about forty yards southeast. From there she participated in the community defense like *L*. *R2*, and the neighborhood Mockingbirds. However, she was not so aggressive as the two males and did not fly beyond her territory boundaries in pursuit of strangers as *L* did. He made the longest flights of the three in driving them away. Her territory was about three-fourths of an acre but the two males had one and one-half acres each, the latter area being much larger than those of residents at the station in previous years during fall and winter. *L* remained in the rear, *R2* at the front, each using adjoining vacant property also.

The next two weeks were spent in the established daily routine; the morning hours were the busiest in defense. The males sang at length on warm days in a calm manner, with decreasing zeal on the chilly days, and had ceased entirely by November 11 although a few songs were heard elsewhere later. Once a territory song of the female was heard that sounded like "*towhee, towhee*". All were alert to keep off intruders but in previous years, this period of late fall had been marked by some fights and dances between the territory holders and also between the residents and new arrivals seeking to establish territory. *Bf* had been seen in several dances and one fight on her boundary line in 1934. In the 1935 season, only one similar encounter was seen. On December 11 *R2* met his neighbor (to the north) on a hedge, then on the lawn, where they fought and danced. This dance occurs frequently among Mockingbirds as a territory

boundary maneuver. The participants face each other, with heads erect; they step forward, backward, sideways, in a dignified manner for a moment or several minutes. Sometimes the sidestepping may continue for twenty-five yards with each bird remaining on his own side of the boundary line. It terminates usually by each turning suddenly to his own side to fly away or to feed on the ground. It may end in a fight or follow one. Once in late November, 1935, *L* and *R2* were noted in the first stages of an encounter when they met in a tree on their boundary line but they separated without fighting and without meeting on the ground for the characteristic dance. On December 2, 1935, one of the neighborhood birds fought his reflection in the windows of a parked automobile. This had been a habit of *Y* in previous winters, starting in November and continuing spasmodically through February. He dashed at his own reflection in windows of both house and garage.

In previous years several instances also are on record when the short territory songs were heard from *B's* section occasionally between the hours of midnight and 3 A. M. on bright nights between October 2 and December 1. There are also records of the staccato *chi-chi-chick* being heard then, but in 1935, except for one territory song during the night of October 12, these calls were the only night time sounds heard and they probably indicated a predatory creature had disturbed them for Cardinals joined in the alarm with a series of *chips*.

By December, Mockingbirds were conspicuous only at dusk when the various sharp calls were heard as they went to roost. Unusually cold weather had descended upon us and during the day only occasional *chy-uk* or other calls were heard and they sat hunched in sheltered places or greeted the first falling snowflakes with harsh *chucks* seemingly to show their disapproval. They continued to scold the Robins and Starlings, flew at the Cardinals, consumed halved apples, suet, hackberries, and on the milder days, probably found a little insect food as they searched on the ground. However, this proved to be the most disastrous winter to resident birds in the five winters of banding. The extreme cold and frequent snows not only denuded shrubbery that usually retained foliage to provide roosting places but it also deprived Screech Owls and Sparrow Hawks of food so that they were unusually predacious at the banding stations. At intervals during the winter months the three resident Mockingbirds and the pair of resident Cardinals disappeared when nights were bright and both cats and Screech Owls had been seen.

Bf was the first bird to be missed early in December. A thorough search for her remains yielded only the feathers of a freshly killed quail on her territory. The following day her section was occupied and defended by another Mockingbird wearing only an aluminum band.

On January 2, 1936, the snow melted and mild temperatures prevailed for the first half of the month. A Mockingbird elsewhere was reported singing during that period but none of those about the station sang. In 1935 *B* sang during two weeks of mild weather in January. That year for a few days, temperatures typical of our normal April weather prevailed when he not only came into song but also began to court *Bf* and they used their combined territories together. She showed interest in him also. A sudden drop in temperature sent each back to its own territory until the normal mating season here in early March. However, during the mild weather of 1936, the males, *L* and *R2*, again met on their boundary lines in a tree but after hopping after one another a brief time, they parted, each flying to his own side. They almost ignored the apples and suet as insect food was again available on the lawns; *R2* enjoyed the holly berries on the discarded Christmas wreath which he had previously attempted to get as it hung outside of a window. One morning as traps were being set below his perch on a wire, he gave a squawk, *L* answered immediately; then others near homes in the neighborhood responded with squawks or *chucks*. But on the night of January 12, a cat was seen prowling in that shrub border. On the 13th, it was a surprise to see *L* in a prolonged fight there with a Mockingbird. *R2* was gone. A new bird was seen feeding on the privet berries daily. *L* would appear on the west part of the former territory of *R2* and watch this other bird while he fed on the east section. It took some time to identify the new arrival which was also wearing bands. By the 18th, the severe weather and snow had come for another long siege. On the 20th, the new arrival would not permit Robins to roost in that east shrubbery clump although he came there apparently only to feed. He was fond of raisins and made quick flights for the few outside of the traps in the front section. On the first of February he was seen flying to the traps at the rear for at that time *L* also disappeared and there was no territory defender to keep him away from any of the raisins. He announced his coming by alighting near a group of traps or a feeding place, giving a number of *chucks* before flying down to eat. He was finally trapped on February 8 and proved to be *ABA*, the 1935 mate of *Bf* whom she had joined at a neighbor's after the death of *B* in

March, 1935. He now had a feeding range of at least 300 yards in length for he visited traps all over the station but seemed to use it mostly to feed on the coveted raisins, returning to the neighbor's garden. He would come to the window sill if raisins were there and continued to announce his coming with *chucks* even though no other bird of any species was feeding.

On February 28 he began to sing a soft toned song near the front east clump of shrubs and it was thought he had decided to claim that territory at the station. On February 29, another arrival was trapped at the rear which also proved to be a former acquaintance, *GAG*, banded in September, 1935, and which had repeated until October. The plumage was sooty as a wintering bird and the measurements and markings seemed to indicate it was either a young bird or a female. It remained unobtrusively in the rear until March 23. *ABA* was found in the rear trap on March 6. On March 8 another banded bird arrived but this one was conspicuous as he sang from various perches in the front section of the lot. He was *AYG* that had been banded at the neighbor's when nesting there in July, 1935. His territory there had been just beyond that of *ABA* and *Bf* during that summer. He was singing gayly in the mate calling manner; his songs were richly interspersed with brilliant imitations of quail calls, Summer Tanager, Cardinal, and other songs. Females came to visit. *ABA* apparently did not resent his coming and retired to his former territory at my neighbor's where he too sang zealously.

March 19 was an exciting day, for several unidentified Mockingbirds appeared on the front lawn. There were courtship flights, much song, and a female that remained with *AYG* and was banded. This pair spent most of their time on the front section, but even then *ABA* came at least once for raisins entrapping himself on their territory. On the morning of March 28, *AYG* was seen limping as if his right leg or foot was injured. His songs ceased. Attempts to trap him were not successful. Late afternoon of the second day an unbanded male arrived, which he was seen fighting on top of the drop trap, while his mate stood nearby. He could not be found after that and his mate also disappeared the next day. It was thought at the time that he may have died as he was not seen anywhere in the neighborhood. However, in June of 1936, he re-appeared at the station for one day and in full song, and came to the front for apple. His injured leg seemed almost normal but again efforts to trap him met with no success. After the March disappearance of *AYG*, the new bird took possession, fed on the apple and was soon banded *BAB*. The same day that *AYG*

was noted limping (March 28, 1936) another Mockingbird had appeared in full song on the rear territory which *GAG* had apparently deserted. This new bird was soon identified as *AA*, another acquaintance of 1935. His outstanding imitation was the call of a Sparrow Hawk. He is the one previously mentioned as the bachelor bird that sang until mid-July and often far into the night on his territory some 300 yards east of the banding station. This spring he quickly secured a mate; an unbanded hen joined him on March 30 and they occupied the rear half of the lot where *L* was the early occupant in the winter of 1935. *BAB* sang on the front section that *R2* and the others had used in turn this winter but left in early May of 1936 without winning a mate. *AA* and *BAB* met on their boundary line on April 7 (the same place *R2* and *L* had met). They fought and performed a few dances while the mate of *AA* remained on their side as a spectator or looked for food in the grass about a yard away. These dances were common occurrences during previous winters and early spring between the resident birds on their boundary lines but in the winter just passed, it was seen only the two times mentioned in this paper at the banding station and only a few times elsewhere. It has been noted that many of the performances in the past occurred on the milder days, so perhaps the very cold weather as well as the frequent changes of occupant on a territory may account for the difference.

The events of the past winter again show the importance of distinctive banding for sight identification in order to acquire an accurate understanding of daily occurrences in bird life. Otherwise it would have been impossible to know how many different birds in turn occupied the garden this winter, how different the situation was from previous winters, or how quickly neighborhood birds fill vacancies in favorable locations. During the winter of 1931-32, *B* and *Y* were the occupants and they remained for nesting. In 1932-33 *B*, *Y* and *R* spent the winter but *R* left in March and did not sing. In 1933-34 *B*, *Bf*, *Y*, and *L* wintered but *L*, unable to win a mate that spring after singing several weeks, left in April. He was found mated that summer a few hundred yards south. In 1934-35 *B*, *Bf*, *R2*, and *X* wintered, the latter leaving in March without ever singing. But in 1935-36 the winter territory holders, *Bf*, *L*, and *R2* had all apparently met death by the first of February and their territories were occupied in turn by five individuals, not counting the two females that joined the male occupants. All but one of the eight 1935-36 territory holders had been located in the neighborhood previously. Only one of the eight remained for nesting in the 1936 season and *ABA* was still singing for

a mate in mid-June spending most of his time at the neighbor's, but sometimes coming to the front section of the banding station to sing and feed on apple (no raisins were placed at the traps in summer).

Observations made at other places in Nashville yielded some unusually interesting data that revealed situations existing within a few miles of the home station that had not been observed in the several years study of the birds there.

At the Belle Meade substation, four miles southwest, the mated pair did not separate in the fall as other pairs studied had done. This pair remained together in a companionable manner, following one another to perch in the same tree, stopping to drink at the same pool, and apparently on the same friendly terms with each other as Chickadees, Tufted Titmice, and Cardinals are with their winter companions. A tragedy in late December unfortunately brought this interesting observation to an end when the male bird fell victim to a Screech Owl one bright night when the ground was deeply covered with snow. His cry of distress brought the Tompkins family outdoors in time to see him carried off from his roost in an evergreen at their living room window.

At the home of Mrs. K. Jordan, close to the business section of Nashville, another pair was watched in the season just passed that had remained together all winter. They came to the feeding place together during the cold weather. One waited while the other fed and on the very cold nights, both roosted in a garage, the door of which was purposely left open until they had gone inside. Their roosting places in the building were separate, and the garage was not used on mild nights. This pair began their nest in a large rose vine when the weather was still cold in March and the set of four eggs was being laid and brooded in the well made deep nest the first week of April when a belated snowstorm and freezing temperatures damaged vegetation. When the four nestlings were only a few days old, the mother bird was eaten by a cat. Although the male fed them, he did not brood them and they died the second night after the death of the mother bird. This male bird immediately began to sing again and in a few days had secured another mate which seems rather interesting when birds in the suburbs seemed to have much difficulty in getting mates.

Another interesting but mysterious observation was recorded in late February last year (1935) near another substation. On the 24th, a mild sunny day when the mean temperature for the month had been above normal, a hillside thickly grown with bushes and small trees

was found to be teeming with Mockingbirds in late afternoon. Between 4 and 5 P. M., thirty-nine were counted in this area of 440 by 200 yards. They flew about, perched, sang, and pursued each other in what appeared to be a playful mood. A few of the hissing *cha* notes were heard in some of the pursuits which seemed to indicate some females were present. Sometime as many as six perched at one time in the same tree—a most unusual sight in many years of Mockingbird observation here. They were not feeding. There was no fighting, no serious courtship pursuits, nor plumage display. They were all dark colored, sooty birds, typical of wintering birds in Nashville, which seems to eliminate the migration theory. No banded birds were sighted in spite of the fact that it was near a substation. A visit at dawn eliminated the roosting theory also as only five could be located in the leafless shrubbery when Jack Calhoun searched. At 1 P. M. four or five were found but at 4 P. M. there appeared to be as many as on the previous afternoon, and they behaved as on that day. The following day a heavy rain fell, freezing, and turning into a snowstorm. With driving too dangerous to attempt the six-mile round trip over the hills, it was not until the fourth day later (March 1, 1935) that the thicket could again be visited. There was one bird at each end of it, where on March 30, Jack Calhoun found nests, both of which contained their complete sets of three eggs. What could be the meaning of those mysterious gatherings on at least two successive days in late afternoon?

Study of individual birds by the color banding method becomes more interesting each season and the student is convinced that nothing should be taken for granted in bird study: that in bird life individuals do not conform to a set behavior pattern; and that the subject is inexhaustible.

NASHVILLE, TENNESSEE.

FEATHER ARRANGEMENT, DEVELOPMENT, AND MOLT OF THE LONG-BILLED MARSH WREN

BY WILFRED A. WELTER

A few years ago, while doing an intensive study of the Long-billed Marsh Wren (*Telmatodytes palustris dissaeptus*)[1], a series of nestlings and adult birds were collected to study the feather arrangement and development of the species. The ages of the nestling birds collected were known so that the changes from day to day will be recorded in subsequent pages. Boulton[2] worked out in detail the growth of feathers and the pterylography of the House Wren, and a comparable study on the Marsh Wren using his terminology and his limitations of various regions was considered worth-while.

Growth and Development of Nestling Feathers

For convenience in the treatment of this section the development of the feathers in the various regions will be treated separately. Plates are presented to illustrate the growth and development that has taken place during the nest life of the young.

Capital Tract

First Day. No feather development is apparent.

Second Day. Feather sheaths are visible beneath the skin in the coronal region.

Third Day. All of the sheaths are apparent beneath the skin except the auriculars. Growth proceeds forward, backward, and laterally from the coronal region.

Fourth Day. A few sheaths are now visible at the anterior end of the auricular region while those in the coronal region have pierced the skin.

Fifth Day. The sheaths are all apparent except those at the posterior margin of the auricular region.

Sixth Day. All of the sheaths have pierced the skin except those in the loral and post-auricular regions.

Seventh and Eighth Days. All the sheaths have pierced the skin. The post-auriculars were the last to do so.

Ninth to Twelfth Days. The feather sheaths wear away during this period. Those which appeared first are usually the first to break through the sheaths. Neossoptiles are still present on the tips of some of the feathers.

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[1]Welter, Wilfred A. The Natural History of the Long-billed Marsh Wren. Wilson Bulletin, 47:3-34, 1935.

[2]Boulton, Rudyerd. Ptilosis of the House Wren (*Troglodytes aedon aedon*). Auk 44:387-414. 1927.

Spinal Tract

First and Second Days. No feather sheaths are visible.

Third Day. All of the sheaths appear beneath the skin.

Fourth Day. Sheaths in the middle expanded area have broken through the skin.

Fifth to Seventh Days. Development proceeds anteriorally from the mid-dorsal region. Those cervicals that form the anterior boundary of the spinal tract appear above the skin on the seventh day. The sheaths at the posterior boundary of the tract pierce the skin on the sixth day and then development proceeds anteriorally until it meets the mid-dorsal region.

Eighth to Twelfth Days. During this period the sheaths disintegrate or are worn away. The first feathers to appear are those in the mid-dorsal and pelvic regions. On the tenth day all of them have broken through their sheaths.

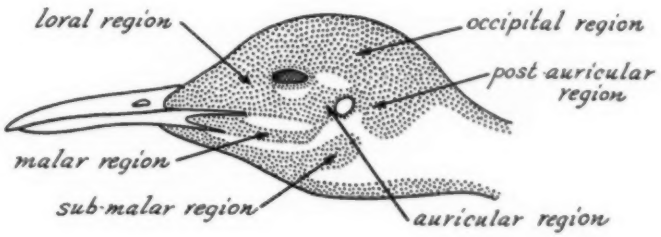

Fig. 39. Pterylography of the Marsh Wren. Lateral aspect of the head.

Caudal Tract

First and Second Days. There is no sign of feather development.

Third and Fourth Days. The rectrices and upper tail coverts are visible beneath the skin.

Fifth and Sixth Days. Sheaths of the rectrices and upper tail coverts pierce the skin on the fifth day while those of the under tail coverts appear beneath the skin during this period.

Seventh to Twelfth Days. All the feathers in this tract have now broken through the skin. The inner rectrices and their coverts appear first and then growth proceeds laterally. On the ninth day the sheaths begin to disintegrate.

Ventral Tract

First Day. There is no trace of feather development at this time.

Second Day. Sheaths on the throat and sides become visible.

Third and Fourth Days. All of the sheaths can be detected at the end of this period.

Fifth to Twelfth Days. The first sheaths to break through the skin are on the sides. Development then proceeds in both directions so that on the eighth day all of the sheaths have come through. Those located in the throat region are the most retarded. On the eighth day most of the sheaths have been broken, the appearance of the feathers follows the order of that of the sheath, those of the throat not appearing until the tenth day.

Humeral, Femoral, Crural Tracts

First Day. There is no sign of development.

Second and Third Days. The sheaths in the humeral tract are quite distinct while those in the femoral tract are just beginning to show.

Fourth Day. The humeral sheaths have broken through the skin while those in the other tracts are developing rapidly.

Fifth to Seventh Days. All of the sheaths in these regions pierce the skin during this period. Those in the anterior section of the crural tract are the last to appear.

Eighth to Twelfth Days. The tips of the feathers begin to appear on the eighth day and by the twelfth day the sheaths have been almost entirely worn away.

Alar Tract

First Day. There is no sign of development of sheaths.

Second Day. Development has gone on very rapidly as by the end of this day both primaries and secondaries have begun to break through the skin.

Third and Fourth Days. All of the primaries and the first seven secondaries have broken through the skin. The secondaries develop from the outermost inward while the primaries all develop in such rapid succession that it is impossible to say which come first. On the fourth day the under-wing coverts are visible beneath the skin.

Fifth Day. All of the flight feathers have appeared inclosed in their sheaths as have the greater coverts and the alula.

Sixth Day. The middle coverts break through the skin on this day while the lesser and marginal coverts are very pronounced beneath the skin.

Seventh Day. The middle coverts have pierced the skin, those of the secondaries preceding those of the primaries. The marginal and under-wing coverts and the lesser coverts of the secondaries have also appeared.

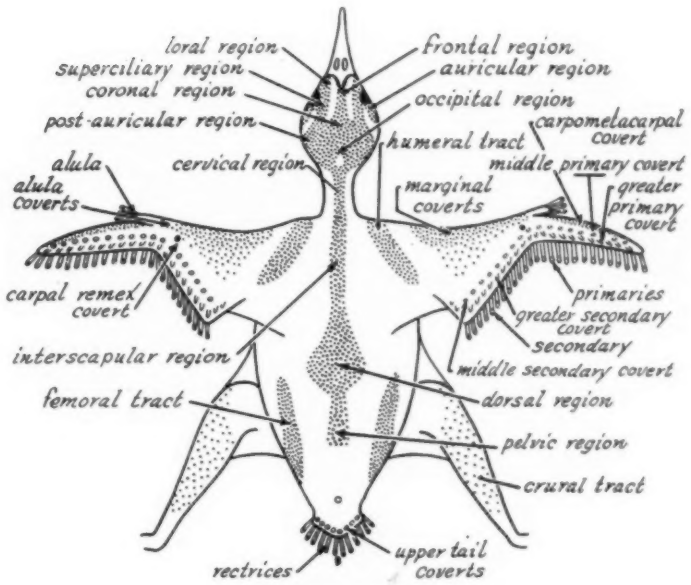

FIG. 40. Pterylography of the Marsh Wren. Dorsal aspect.

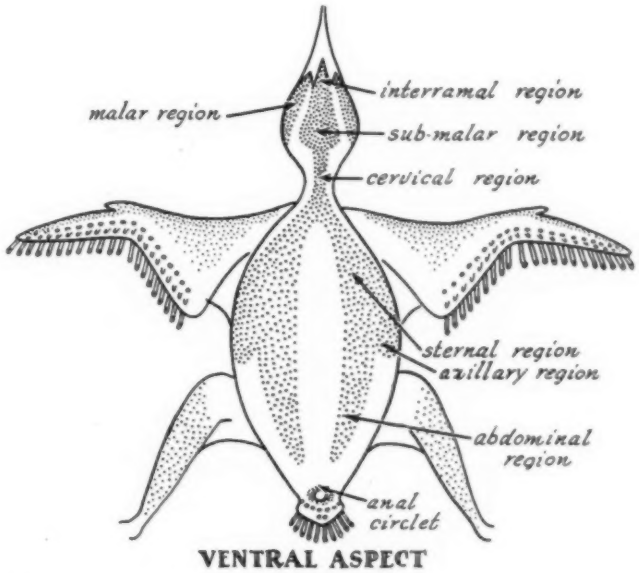

FIG. 41. Pterylography of the Marsh Wren. Ventral aspect.

Eighth Day. All of the feathers have broken through the sheaths except the ninth and tenth primaries and the marginal coverts.

Ninth to Twelfth Days. The remainder of the feathers break through the sheaths and there is a great increase in size of the flight feathers. At the end of this period portions of the sheaths may still be present on some of the primaries and secondaries.

Comparison

The order of appearance of the feathers of the nestlings of this species agrees very well with that of the House Wren as reported by Boulton (*op. cit.*). Development on the whole seems to take place somewhat more rapidly in the Marsh Wren. The rate of growth of various feathers in the two species parallels one another rather closely as illustrated by Fig. 42. Measurements of certain feathers were taken on the nestlings that were collected and appear in Table 1.

The percentage of ultimate growth obtained by certain feathers and fleshy parts on the twelfth day is illustrated in Fig. 42, the comparable measurements for *Troglodytes* being taken from Boulton's paper. As in the House Wren, the posterior portion of the body is much slower in developing than the anterior portion. It is also interesting to note that the tarsus has obtained practically its entire growth by the time the young bird is able to leave the nest.

Pterylography

In this study of feather arrangement two methods were employed: (1) examination of preserved specimens of young birds, and (2) examination of preserved specimens of adults in which the feathers were clipped close to the body.

The arrangement of the various feathers is very similar to that of the House Wren as recorded by Boulton. Only points in which the two species differ will be discussed in the present study but complete diagrams of the pterylography of the Marsh Wren are depicted in Figs. 40-41.

In the capital tract the two species vary in the distinctness of certain apteria. Two apteria completely separate the malar region in the House Wren. In the Marsh Wren, however, a few feathers cross from the malar to the auricular region tending to terminate the upper malar apterium at its juncture with the sub-malar. Again, in the House Wren the auriculars are separated from the post-auriculars by a definite apterium while in the Marsh Wren this has become very minute and is scarcely visible.

The caudal tract differs in the number of tail-coverts. While only five pairs of upper tail-coverts are present in the House Wren, the

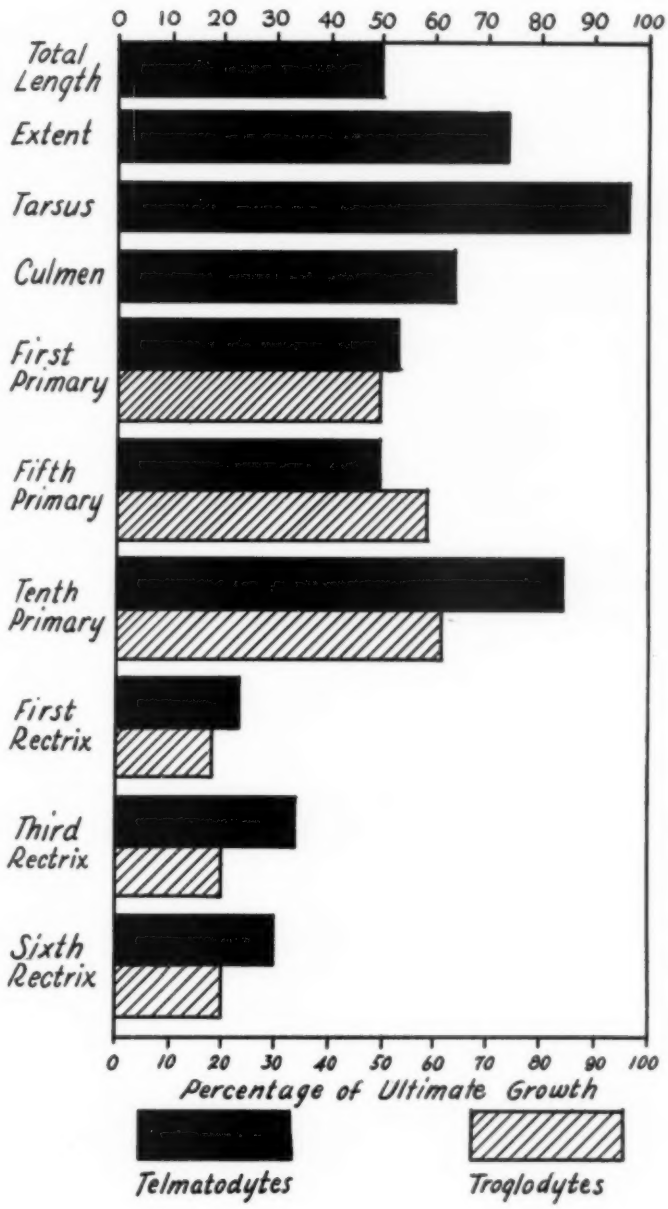

FIG. 42. A Graph showing the percentage of ultimate growth by the twelfth day.

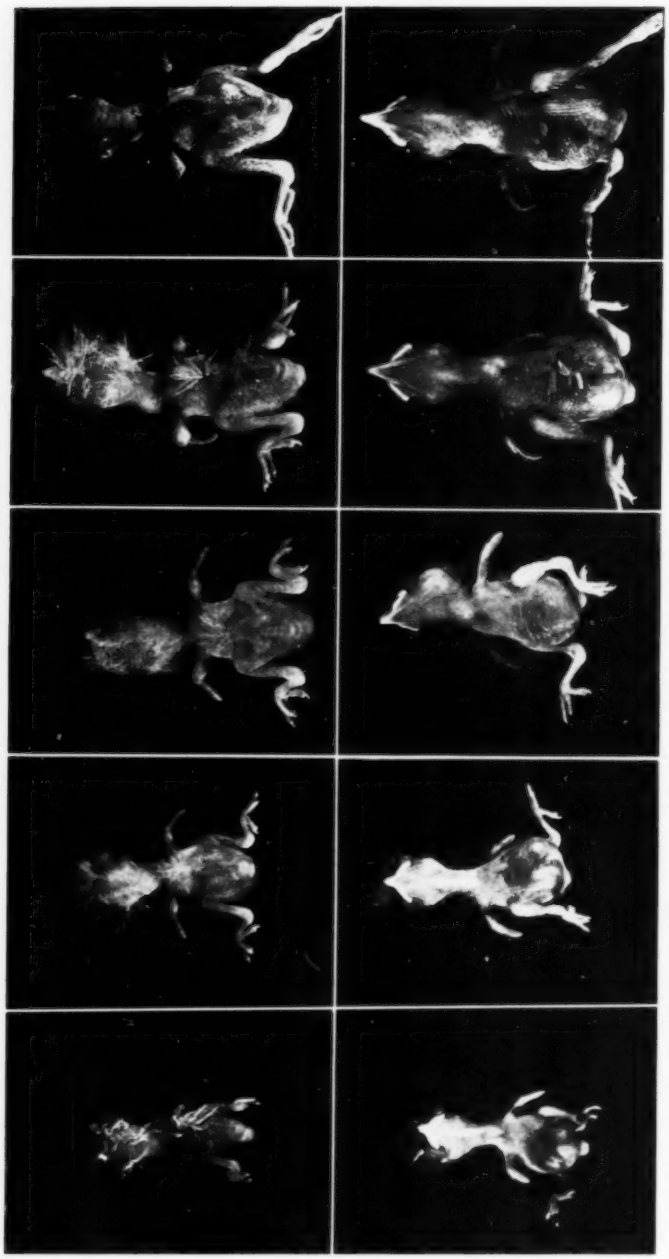

FIG. 43. Photographs showing feather tracts on successive days. Top row shows dorsal surface. Bottom row shows ventral surface. From right to left the figures show the bird at hatching, first, second, third, and fourth days.

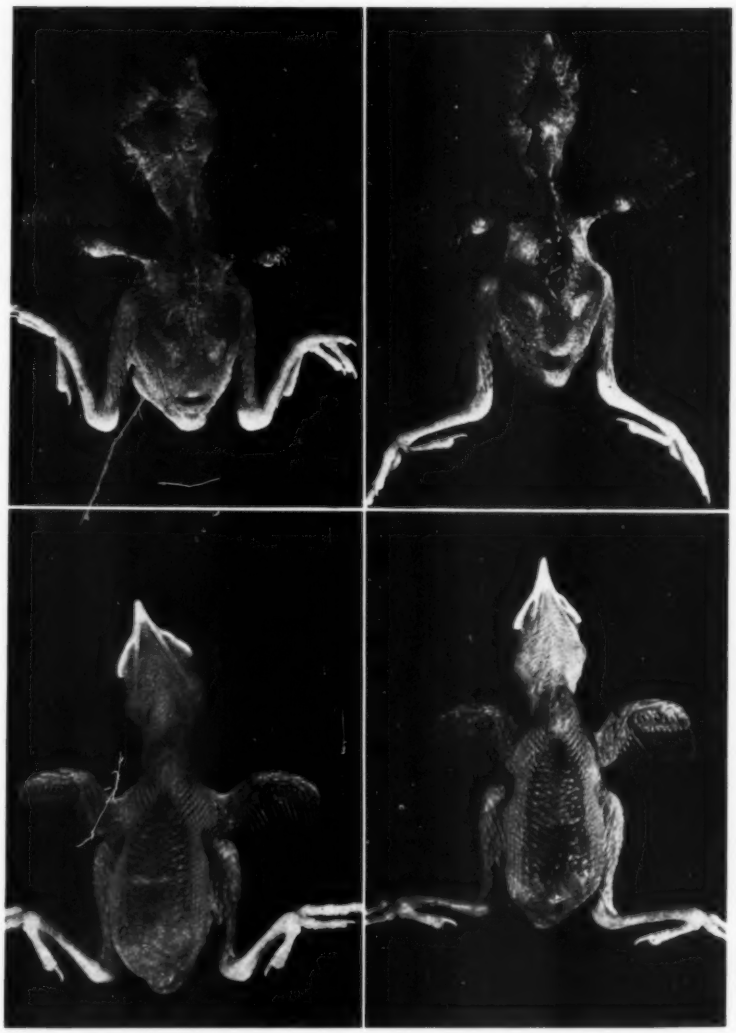

FIG. 44. Photographs showing feather tracts on successive days. Left top, fifth day, dorsal; left bottom, fifth day, ventral; right top, sixth day, dorsal; right bottom, sixth day, ventral.

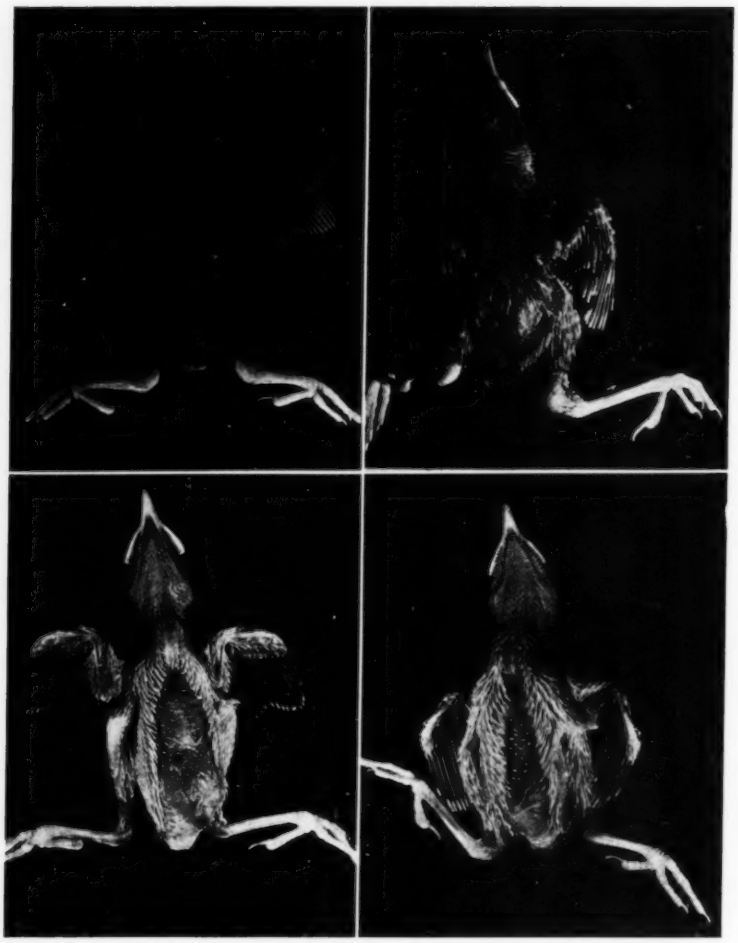

FIG. 45. Photographhs showing feather tracts on successive days. Left top, seventh day, dorsal; left bottom, eighth day, ventral; right top, ninth day, dorsal; right bottom, ninth day, ventral.

FIG. 46. Photographs showing feather tracts on successive days. Left top, tenth day, dorsal; left bottom, tenth day ventral; right top, twelfth day, dorsal; right bottom, twelfth day, ventral.

first pair, although somewhat smaller, is clearly discernible in the Marsh Wren. Boulton suggests the possibility of seven pairs of under tail-coverts in *Troglodytes*, this questionable pair is present in *Telmatodytes* and, from its position, must be regarded as a seventh pair. The first coverts in this form, also, lie above and posterior to the second.

Certain differences were observed in the alar tract. The vestigial eleventh primary mentioned by Boulton was not noted in this form. There are ten greater primary and ten middle primary coverts in *Telmatodytes* while only seven of the latter are present in *Troglodytes*, together with ten greater secondary and seven middle secondary coverts. It is impossible to determine the number of lesser coverts as they are not distinct from the marginals. The under wing-coverts are similar to those of *Troglodytes* except that there are nine middle and seven lesser secondary coverts in opposition to eight and seven, respectively, in the House Wren.

In all other details the two genera are in complete agreement. The classification used in this discussion, in the diagrams, and in the section on feather growth of the nestlings has been taken from Boulton's paper.

Plumages and Molts

The most complete account of the sequence of plumages in the Long-billed Marsh Wren is that of Dwight[3] who is quoted at length below:

"1. Natal down. White.

"2. Juvenal plumage acquired by a complete postnatal moult. Crown, nape and part of back brownish, a few faint white lines on the nape; the scapularies, rump, and upper tail coverts Prout's-brown often russet tinged. Wings and tail dull black, the tail barred, the tertiary edgings mostly black, the coverts and secondaries brownish edged, the primaries paler with indications of barring. Sides of head dusky; a faint whitish superciliary line. Below, white, washed on sides of breast and flanks and on crissum with pale cinnamon. Bill and feet dusky pinkish becoming dusky.

"3. First winter plumage acquired by a partial postjuvenal moult, beginning about the middle of August, which involves the body plumages, the wing coverts, and the tertiaries, but not the rest of the wings nor the tail, young and old becoming practically indistinguishable. This plumage may easily be mistaken for the juvenal. Similar

[3]Dwight, Jonathan. The Sequence of Plumages and Moults of the Passerine Birds of New York. Ann. N. Y. Acad. Sci., 13:296-297. 1900.

to previous plumage, but the brown rustier above, a brown median line dividing the black crown; the anterior part of the back is black with distinct white streakings; the superciliary line white; the tertiaries duskier and more mottled below, the cinnamon wash is deeper with sometimes a pectoral band and there is obscure whitish and dusky barring on the sides, the crissum distinctly barred.

"4. First nuptial plumage acquired by a complete prenuptial moult as indicated by the relatively unworn condition of the feathers when the birds arrive in May. Although I have no positive evidence of this moult, spring birds are in quite as fresh plumage as those of autumn and I do not believe the latter could be so little affected by wear during the winter months as not to show more of it on their return. This plumage is the same as the last, perhaps whiter below and with less obvious barring on the flanks and crissum and it becomes badly frayed before the end of the breeding season.

"5. Adult winter plumage acquired by a complete postnuptial moult in August. Practically indistinguishable from first winter but the wings and tail usually grayer, the tertiaries and wing coverts more heavily barred.

"6. Adult nuptial plumage acquired by a complete prenuptial moult the same as in the young bird.

"Females.—The sexes are alike, the female perhaps averaging a little duller, and the moults are the same."

The writer is at variance with Dwight and Stone[4] in certain respects concerning the manner of acquiring first winter and nuptial plumages. Juvenals collected during the fall of 1931 which are now in the Cornell Collection show a molt of both rectrices and remiges. In one specimen the three innermost primaries in both wings are beginning to come in before there is any noticeable molt elsewhere. Another specimen shows an entire new set of tail feathers just appearing while other parts of the body are well along with the molt. The remiges are worn to such an extent that they are little more than bristles at the time molt begins.

I can find no evidence of a prenuptial molt in the series of specimens examined. One individual taken in March is replacing a few crown feathers, but this seems to be an erratic case as others during the same period and even later show no such molt or fresh plumage. Birds taken during the winter months show some wear of the feathers

[4]Stone, Witmer. The Moulting of Birds with Special Reference to the Plumages of the Small Land Birds of Eastern North America. Proc. Acad. Nat. Sci., Phil., 48:164. 1895.

but this becomes more apparent during the summer. It seems to be a gradual process without any indication of renewal of plumage. As summer advances wear continues in conjunction with fading through the action of the summer sun so that it becomes impossible to distinguish certain of the races until the acquisition of the winter plumage. The amount of wear during the winter months varies to a certain extent with the individual but no specimens examined were entirely free from it. Fall birds are noticeably more plump with longer feathers than the birds which arrive in the spring.

The plumages and molts in my opinion should be given as follows:

1. Natal down.
2. Juvenile plumage acquired by a complete postnatal molt.
3. First winter plumage acquired by a *complete* postjuvenal molt.
4. First nuptial plumage *acquired by wear.*
5. Adult winter plumage acquired by complete postnuptial molt.
6. Adult nuptial plumage *acquired* by *wear* as in the first nuptial plumage.

Order of Molt

The primaries are the feathers that initiate the molt. The inner three are shed almost simultaneously and then one is lost at a time until all are shed. Before the primaries are entirely replaced the secondaries are shed, from the outside inward. It is impossible to give the exact order in other regions as the intervals between the various parts are very slight. The feathers of the ventral tract begin to molt before any of the other body feathers. These are followed very closely by the interscapulars and the crown feathers. The wing coverts are somewhat later than the remiges while the rectrices are lost before the last primary is shed. The tail feathers are molted in such rapid succession that it is impossible to tell which comes first and the ingrowing feathers appear approximately of the same length.

There is considerable variation in the time of molt especially among the birds of the year. Many specimens taken from August 10 to October 15 show some stage of molt. This naturally would be expected as the younger birds of the second brood are not as far advanced as the older birds.

Unusual Plumages

A specimen of *marianae* taken at Chassahowitska Bay, Florida. (Biol. Surv. 261977) has the fifth and eighth secondaries on the left and the eighth on the right side white. In other respects the plumage

is normal. Ray[1] reported a specimen of *paludicola* from Alameda, California, which had several crown feathers and one secondary pure white.

TABLE 1. Measurements of Nestlings (in millimeters).

The Day	j.h.	1day	2day	3day	4day	5day	6day	7day	8day	9day	10day	11day	12day
Total length	31	33	38	42	50	58	60	62	64	65	71	73	74
Extent	29	31	43	45	70	75	80	82	97	100	112	114	120
Wing	4	4.5	5	6	7	11	19	19	23	25	28	30	38
Tarsus	3.5	5	7	7	10	12	14	15	16	16	19	20	21
Middle toe and nail	4	4.5	5	6	7	9	11	11	13	13	14	15	15
Nail	.5	.5	1	1	1	2	2.5	2.5	3	3	3	4	4
Culmen	3	3	4	4	5	6	6	6	7	7	7.5	8	9
Gonys	2	2	2	2	2	2	3	3	3	3	3.5	4	5
Gape	5	5	7.5	7.5	9	11	11	11	13	13	13	13	14
Rictus	3	3	5	5	5	7	7	7	7	7	7	7	7
6th rectrix	..	..	..	..	..	.1	1	2	3	4	5	7	10
3rd rectrix	..	..	..	..	..	.1	1	2	3	5	7	9	14
1st rectrix	..	..	..	..	..	.1	1	2	2	4	5	7	10
1st primary	..	..	..	..	1	4	6.5	8	11	15	18	20	24
5th primary	..	..	.	..	1	4	6.5	9	11	15	19	21	25
10th primary	..	..	..	..	1	2	3.5	6	7	10	11	13	16
1st secondary	..	..	..	..	1	4	6	8	11	14	17	19	24
4th secondary	..	..	..	..	.75	3	6	8	10	13	16	18	23
8th secondary	..	..	..	..	.25	2	3	4	6	10	12	13	15

STATE TEACHERS COLLEGE,
MOREHEAD, KENTUCKY.

THE OCCURRENCE OF WHITE HERONS IN THE YOUNGSTOWN, OHIO, REGION

BY M. B. SKAGGS

Since the late George L. Fordyce recorded the first American Egret to be seen at Pine Lake on July 29, 1918, other white herons have appeared frequently in the Youngstown, Ohio, area. Published records of these visitors, however, are very few. For this reason it seems desirable to place on record the pertinent facts regarding the appearances of these herons in the past sixteen years. The data here presented are from the notes of Mr. George L. Fordyce, Mr. G. M. Cook, Dr. J. G. Brody, Mr. V. McLaughlin, and the writer.

The three species concerned in this paper are the American Egret (*Casmerodius albus egretta*), Little Blue Heron (*Florida caerulea*), and the Snowy Egret (*Egretta thula thula*).

[1]Ray, Milton S. Notes from Alameda, California. Bull. Cooper Ornith. Club, 1:53, 1899.

Several small lakes are within twenty miles of Youngstown and prove quite attractive to migrating waterfowl. Of these, Pine Lake has had the most unusual bird visitors but interesting records have also come from Milton, Meander, Beaver, and Liberty Lakes. None of these lakes are more than three-quarters of a mile in width but they vary from one to seven miles in length. The accompanying map will show the location of these reservoirs.

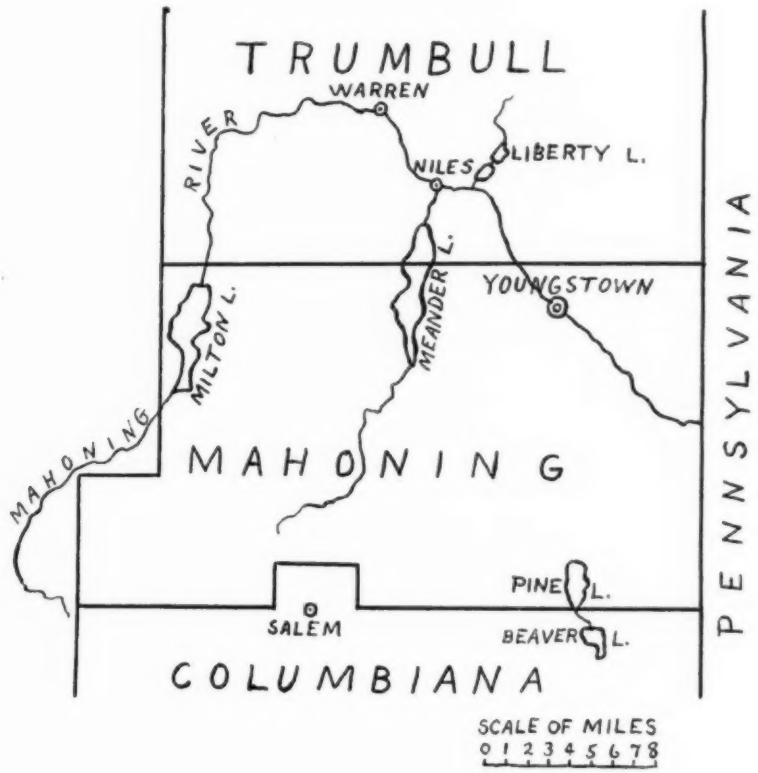

Fig. 47. Map of the Youngstown, Ohio, Region.

The first white heron, an American Egret, recorded for Youngstown by Fordyce on July 29, 1918, was again seen on August 4 and was last seen on September 5, 1918. No other white herons were noticed until 1924, when *all three* species appeared! Three Little Blue Herons were seen on August 7 and 8, one American Egret on

August 10 and 14 and two Snowy Egrets on August 14 and 15. All three birds were seen at Pine Lake by Fordyce and others.

In 1925 Mr. Fordyce saw a single American Egret at the same place on August first, second, and ninth.

The writer can find no published records until August, 1930, when Marshall[1] reported twenty-six Little Blue Herons and three American Egrets at Beaver Lake. The summer of 1930 was very dry and was noted for the large number of white herons appearing in all sections of Ohio. Since Hicks[2] in his summary of records of the 1930 occurrence of these herons in Ohio, gave no Youngstown records, the part of this paper dealing with that year may be considered as a supplement to his fine article.

All through August, 1930, American Egrets were present at Pine, Milton, and Beaver Lakes. A maximum of seven were noted on August 8. Little Blue Herons were numerous. On one occasion twenty-seven were seen in a group at Pine Lake. They were also present in smaller numbers at other lakes.

In 1931, only two American Egrets were noted. The date was August 9.

In 1932, three were seen on July 28, two on August 4, three on August 8, and the last ones were reported on September 15. One of these birds was found perched fully sixty feet from the ground in a tall tree, quite in contrast to most of the others seen wading in the shallow lakes.

The summer of 1933 brought even a greater wave of white herons than that of 1930, but this time the American Egrets were in the great majority. This was just the reverse of the 1930 situation. The feature of this season was the finding of a Snowy Egret on August 6 by Dr. Brody[3] and the writer. This bird still carried a few feathers of its occipital crest, a breeding season adornment. It was observed feeding in the characteristic manner, described by Peterson[4], of standing on one foot while stirring up the water with the other.

A Snowy Egret seen on August 26 by Cook[5], McLaughlin, and the writer was probably the same bird. All three observers saw the yellow toes as the bird flew against a background of green trees. When the bird alighted the orange-yellow lores and black bill were seen.

Snowy Egrets again appeared in 1934 and were reported by McLaughlin[6]. Seven were seen on August 14. They usually were in company of Little Blue Herons but were readily distinguished. On August 20, one observed was so active it seemed to be "running circles" around the slower moving Little Blue Herons.

TABLE 1. Showing Numbers of White Herons in Youngstown Region in 1933 and 1934.

		July 9	July 15	July 16	July 20	July 28	July 29	July 30	July 31	Aug. 2	Aug. 4	Aug. 5	Aug. 6	Aug. 7	Aug. 11	Aug. 12
American Egret	1933	2	5	4				41	52	50		8	8	14		
	1934					6					2					
Little Blue Heron	1933							1	2	2		5		2		
	1934				1	3	5				24	42		26	20	5
Snowy Egret	1933												1			
	1934											2		5	4	2

		Aug. 13	Aug. 14	Aug. 20	Aug. 25	Aug. 26	Sept. 2	Sept. 4	Sept. 12	Sept. 15	Sept. 16	Sept. 22	Sept. 30	Oct. 1	Oct. 8	Oct. 12
American Egret	1933	6				3	18	11	3					1	1	
	1934	7	8	2		2				2	13	2	3			2
Little Blue Heron	1933			4		7	10	4	1							
	1934	30	39	14	5	10				8	3					
Snowy Egret	1933					1										
	1934	2	7	1						2	3					

It is perhaps worth mentioning that of all the Little Blue Herons seen in the Youngstown region, *not one* has been in the dark plumage of the adult bird.

So frequent were the records of southern herons in 1933 and 1934 that the accompanying table will simplify their presentation.

Bird students all over the country are elated over the increase in numbers of the American and Snowy Egrets in recent years after the Snowy Egrets had become nearly extinct in this country. It is hoped that these frequent occurrences of recent years in a northern state are a true indication of their status. May their tribes increase still more.

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CLEVELAND, OHIO.

A STATISTICAL SURVEY OF THE WINTER BIRD LIFE OF SOUTHEASTERN OHIO—MUSKINGUM COUNTY

BY LAWRENCE E. HICKS AND CHARLES A. DAMBACH

Little is known of the winter bird life of southeastern Ohio. Of the 427 Ohio Christmas Censuses[1] published in *Bird-Lore* (1900-1934), only twelve were from the fifteen hill counties of southeastern Ohio. Even these few censuses were non-representative of their areas, being taken by single observers during the early years. It seemed desirable to accumulate quantitative data about the winter bird life of this typical hill country and make it available for comparison with better known sections of Ohio.

Muskingum County (Zanesville Region) is typical of this hill country, being mostly of eroded dissected hills 100 to 400 feet in height except for the very narrow valleys of the Muskingum River, the Licking River, and Salt Creek.

The writers have been doing constant field work in this region for nearly a year (1934-1935). On certain days (week-end trips or whenever other work permitted) a careful check was made as to the bird species and the numbers of each encountered during a full day of field work. All parts of the county were covered with perhaps more attention given to the eastern half and to the bottoms of the Muskingum River. The period December 15 to February 15 was taken as the winter season so as to include *only* species actually wintering in the area.

During this period eight days in December, nine in January, and eight in February—a total of twenty-five—were devoted to census work. Usually two observers participated. A typical field day was of eight hours and involved six or seven miles on foot and sixty by auto. In the accompanying table the total number of species recorded is given, the proportion of the twenty-five trips on which each was seen, the average number checked per day, and the rank which that species has been found to have among the winter birds of the whole state. The species are ranked by taking into equal consideration (1) the numbers occurring and (2) the percentage of trips upon which each was found. This has proved to be a more accurate index of abundance than any yet available. For brevity only the common names of the birds are used, the nomenclature being that given by the American Ornithologists Union Check-List of 1931.

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[1]Hicks, Lawrence E., and Floyd B. Chapman, A Statistical Survey of Ohio Winter Bird Life. Ohio Journal Science, 33:135-150. 1933.

A roost of 32,000 Starlings and another of 12,000 Crows, occurring in the county, were observed many times, but only individuals of those two species encountered away from the roosts, were enumerated. The Crows and Starlings have made a decided drain upon many winter food resources ordinarily available to other species.

The total number of individuals recorded on the twenty-five trips was 61,711 or 2,468 per day (of which nearly 2,000 per trip would be Crows or Starlings). Species found to be decidedly more abundant than the average for Ohio[1] included: Starling, Crow, Prairie-horned Lark, Bluebird, Robin, American Merganser, and Cooper's Hawk. Species found to be decidedly less abundant than the average for Ohio were Blue Jay, Song Sparrow, Downy Woodpecker, White-breasted Nuthatch, Hairy Woodpecker, Red-bellied Woodpecker, Flicker, Brown Creeper, Winter Wren, Northern Horned Lark, and Red-headed Woodpecker. The other species approached the numbers expected generally in Ohio or the data were too insufficient to be conclusive.

The total number of species recorded (December 15 to February 15) was sixty-five. This represents 49 per cent of the 133 species enumerated on the 427 Ohio Christmas Censuses[1] to date or 39 per cent of the 167 species on the list of birds definitely known to have occurred in Ohio in winter.[2]

Many of the semi-hardy winter birds were absent from the region, and only the Robin and Bluebird occurred in the expected numbers. Most conspicuous was the absence of northern visitors such as the Goshawk, Rough-legged Hawk, Northern Shrike, Bohemian Waxwing, Evening or Pine Grosbeak, Purple Finch, Redpoll, Crossbills, Longspurs, or Snow Buntings. Three species rare in winter, the Cedar Waxwing, Killdeer, and Migrant Shrike, were collected for the Ohio State Museum.

The deep waters of the Muskingum River are kept unfrozen at the navigation dams and by the movement of the river barges when operating, making possible the wintering of some waterfowl—all below Zanesville. Many of the raptorials present were attracted to the region of the Starling roost where they could be observed making kills each evening.

This survey covers only one year but should give a fair index to the 1934-1935 winter bird life of Muskingum County if we correct for

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[2]Hicks, Lawrence E. An Annotated Check List of All Birds Recorded from Ohio in Winter. Ohio Dept. Agr. Bull. Bur. Sci. Res. Vol. 1, No. 2, Jan., 1932. (Revised 1935). Pp. 59-66.

many known factors[1] which cause a species to be enumerated out of proportion to its actual numbers.

	Rank of Species Based on Both Numbers and Frequency	Total Number Seen	Percent of Days on Which Seen	Average Number Per Day	Rank of Species in Ohio
1.	Starling*	40,347	100	1614.0	12
2.	Eastern Crow	8,990	100	359.6	4
3.	English Sparrow†	3,057	100	122.3	....
4.	Eastern Tree Sparrow	2,625	100	105.0	1
5.	Slate-colored Junco	1,502	100	60.1	5
6.	Mississippi Song Sparrow	585	100	23.4	3
7.	Eastern Cardinal	582	100	23.3	2
8.	Eastern Bobwhite	521	88	20.9	9
9.	Prairie Horned Lark	414	88	16.6	35
10.	Tufted Titmouse	400	100	16.0	7
11.	Carolina Chickadee	394	100	15.8	13
12.	Eastern Mourning Dove	341	76	13.6	16
13.	Northern Downy Woodpecker	195	100	7.8	6
14.	Eastern Bluebird	206	88	8.2	33
15.	Eastern Robin	280	72	11.2	20
16.	Eastern Goldfinch	215	56	8.6	18
17.	White-breasted Nuthatch	98	88	3.9	8
18.	Carolina Wren	89	88	3.6	22
19.	Northern Blue Jay	59	80	2.4	10
20.	American Merganser	187	36	7.5	43
21.	Northern Flicker	70	64	2.8	15
22.	Common Black Duck	120	32	4.8	28
23.	Eastern Sparrow Hawk	39	76	1.6	21
24.	Eastern Hairy Woodpecker	35	76	1.4	14
25.	Eastern Golden-crowned Kinglet	52	40	2.1	23
26.	Red-bellied Woodpecker	24	72	1.9	19
27.	Lesser Scaup	56	20	2.24	30
28.	Hooded Merganser	29	32	1.2	62
29.	Brown Creeper	25	40	1.0	17
30.	Eastern Meadowlark	27	32	1.1	27
31.	Cooper's Hawk	26	36	1.0	50
32.	Eastern Red-tailed Hawk	15	44	.6	31
33.	Eastern Belted Kingfisher	16	36	.64	40
34.	Ring-billed Gull	23	24	.92	60
35.	Marsh Hawk	11	40	.44	38
36.	Northern Horned Lark	24	8	.96	24
37.	Eastern Screech Owl	13	28	.52	39
38.	Red-eyed Towhee	11	32	.44	32
39.	Herring Gull	20	16	.80	26
40.	Ring-necked Pheasant	9	24	.36	44
41.	Common Mallard	11	20	.44	29
42.	Barn Owl	8	24	.32	68
43.	Eastern Mockingbird	5	20	.20	66
44.	Turkey Vulture	5	20	.20	76
45.	American Pintail	5	20	.20	74
46.	Sharp-shinned Hawk	4	16	.16	55
47.	American Goldeneye Duck	4	16	.16	56
48.	Eastern Winter Wren	3	12	.12	37
49.	Red-headed Woodpecker	4	8	.16	25
50.	Northern Pileated Woodpecker	3	12	.12	69
51.	Northern Red-shouldered Hawk	2	8	.08	49
52.	Cedar Waxwing	3	4	.04	47
53.	Great Horned Owl	2	8	.08	58
54.	Killdeer	2	8	.08	64
55.	Migrant Shrike	2	8	.08	105
56.	Barred Owl	2	4	.04	53
57.	Ruffed Grouse	2	4	.04	54
58.	Eastern Hermit Thrush	1	4	.04	93
59.	Eastern Field Sparrow	1	4	.04	71
60.	Eastern Vesper Sparrow	1	4	.04	124
61.	Pied-billed Grebe	1	4	.04	82
62.	Ring-necked Duck	1	4	.04	89
63.	Gadwall	1	4	.04	102
64.	Bewick's Wren	1	4	.04	77
65.	Bronzed Grackle	1	4	.04	41

*Recently introduced. Not present for whole period.
†Not enumerated.

OHIO STATE UNIVERSITY,
COLUMBUS, OHIO.

WILDLIFE CASUALTIES ON THE HIGHWAYS

BY DAYTON STONER

During the past several years the ever-increasing motor car traffic on our highways has attracted universal attention. The attendant effect that this traffic has had upon our wildlife also has elicited comment both in the daily press and in technical and semitechnical publications. Several contributions on the subject have appeared from the pen of the present writer.

My own latest figures obtained on an extended automobile trip across the eastern half of the United States, together with a desire to organize and analyze briefly the results obtained on previous lengthy trips by myself and others prompts the present offering.

In the course of a round-trip automobile journey between Albany, New York, and Iowa City, Iowa, involving a total of 2,158 miles, Mrs. Stoner and I kept a record of the larger vertebrate animals lying dead on the highways. Without doubt these forms had met death in the passing motor traffic, most of them apparently within the twenty-four hours preceding our passing. The going journey was made between September 21 and 24, 1935; the return, September 29 to October 2, all dates inclusive. Our findings are set forth in Table 1.

From the above figures the casualty rate per mile by States or Provinces is as follows: Iowa, .500; Indiana, .442; Ohio, .374; Illinois, .256; Michigan, .146; New York, .142; Ontario, .129; Pennsylvania, .031.

Strange as it may appear the highest casualty rate occurs in the agricultural states, the four highest being, respectively, Iowa, Indiana, Ohio, and Illinois. However, it should be noted also that in these states, on the average, the casualties were high not so much among *wild* life as among domesticated and semidomesticated forms, particularly domestic fowls, cats, and the English Sparrow. On the other hand, the death rate per mile in the cottontail rabbit was higher in Ohio (.047) and Indiana (.047) than in any other states through which we passed. The per mile reptile casualties also were highest in Iowa (.161) with Michigan (.050), New York (.038), and Indiana (.035) following.

One of the interesting points about such counts is the way that they appear to illustrate the local prevalence of certain species of animals. For example, it will be noted that, of the 116 English Sparrows identified with certainty, 61 per cent (72 individuals) were recorded on the 616 miles traveled in Illinois and Indiana. General

TABLE 1. Counts of Vertebrate Casualties Observed on the Highways, Albany, New York, to Iowa City, Iowa, September 21-25, 1935; and Return, September 29-October 2, 1935.

	State or Province and Mileage Traveled in Each								Totals
	Ontario 247	Illinois 363	Indiana 253	Iowa 118	Michigan 157	New York 673	Ohio 251	Pennsylvania 96	
AMPHIBIANS									
Frogs					1	1			2
REPTILES									
Painted terrapin	2		2	5		3			12
Milk snake						1			1
Bull snake		1	1	2					4
Green snake			1		2				3
Garter snake			1	1					2
Ribbon snake					1				1
Miscellaneous (may include some of above)		6	4	11	4	21	6	2	54
BIRDS									
Virginia rail				1					1
Domestic fowl		12	9	11		3	8		43
Domestic pigeon				1					1
Eastern mourning dove			1						1
Northern flicker					1				1
English sparrow	7	31	41	6	2	7	22		116
Miscellaneous (may include some of above)	5	18	10	8	4	11	22		78
MAMMALS									
Oppossum			1	3			1		5
Weasel						1			1
Common skunk	4	2	5	3		30	6		50
Domestic dog		1						1	2
Domestic cat	2	5	11	1	2	4	7		32
Red squirrel							1		1
Gray squirrel			1			3			4
Fox squirrel			2						2
Pocket gopher		1							1
Meadow mouse (Microtus?)	1						1		2
Muskrat			1	1	1	2			5
Brown rat	1					1	1		3
Jumping mouse	1								1
Cottontail rabbit	4	6	12	1	3	5	12		43
Miscellaneous (may include some of above)	5	10	9	4	2	3	7		40
Totals	32	93	112	59	23	96	94	3	512

field observations in this highly agricultural section attest to the extreme prevalence of this foreign element in its bird population.

Similarly, of the fifty bodies of common skunks observed in the highway on this trip, 60 per cent (30 individuals) were recorded on the 673 miles traveled in New York State. As a matter of fact, 93 per cent of these (28 individuals) were met with on approximately 400

miles of New York State highway west of Syracuse (September 21 and October 1 and 2).

In our 1935 round-trip count, as in our one-way count made in 1934 on approximately the same highway[1], the common skunk was the most frequent casualty observed among the mammals.

An interesting sidelight is worthy of mention in this connection. On October 26, 1935, in again motoring over a part of the same New York State highway traversed on October 1 and 2, we counted fifteen dead skunks, most of them freshly killed, between Batavia and Geneva, a distance of sixty-five miles. This death toll is at the rate of about one skunk for each four miles of travel and is, of course, much higher than the average for this species over the entire trip.

It is a matter of common observation that the cottontail rabbit is a frequent victim among highway wild life casualties. My own counts bear this out. In fact the figures seem to indicate that this mammal is more generally and evenly distributed than the common skunk. This statement, too, I believe, is borne out by the recorded field observations.

The above table shows twenty-one snake casualties on the 673 miles traveled in New York State. It should be pointed out, however, that this entire lot actually was recorded on the approximately 235 miles of highway between Syracuse and the extreme southwestern border of the state via Geneva, Dansville, Olean, and Jamestown. This is largely mountainous or hilly country and rather sparsely populated in the rural sections.

It may now be of interest to compare the findings as recorded by Messrs. William H. Davis[2], W. A. Dreyer[3], and the present writer[4] on rather lengthy automobile trips through more or less similar country. In Table 2 I have taken the liberty of tabulating in condensed form their data, including those above presented by myself for the first time. This tabulation illustrates graphically the factual rate of killing on some 8,000 miles of highway on which the counts were made.

It will be observed that on the writer's 1934 trip of 1,063 miles no effort was made to count other than mammalian casualties. Had the other vertebrate casualties actually been counted the total for the trip would have been considerably augmented. A more or less obvious deficiency also appears in the "Amphibians" column of Table 2

[1]Stoner, D. Science, 81:401-402, 1935.
[2]Science, 79:504-505, 1934.
[3]*Ibid.*, 82:439-440, 1935.
[4]*Ibid.*, 61:56-58, 1925; *Ibid.*, 69:670-671, 1929; *Ibid.*, 81:401-402, 1935.

TABLE 2. Condensed Tabular Summary of Vertebrate Casualties Recorded on 8,303 Miles of Highway.

Date	Observer	Locality	Mileage	Mammals	Birds	Reptiles	Amphibians	Miscellaneous	Total	Average per Mile
1924 June and July	Stoner	Iowa: Iowa City to Lake Okoboji and Return	632[5]	43	142	40	....	....	225	.356
1928 October	Stoner	Iowa to Florida	1400[6]	45	67	81	6	35	234	.167
1933 "Summer"	Davis	Iowa to Massachusetts	500[7]	64	60	12	13	30	179	.358
1934 October	Stoner	Iowa to New York	1063	66[8]	.....	.....	....	....	66	.062
1935 June, July and September	Dreyer	Illinois to Masachusetts and Return to Cincinnati, Ohio	2550	25	9	21	....	6	61	.024
1935 September and October	Stoner	Albany, N. Y., to Iowa City, Iowa, and Return	2158	192	241	77	2	....	512	.237
			8303	435[6]	519	231	21	71	1277	.153

[5]Stoner, D., *loc. cit.* 1925.
[6]Stoner, D., *loc. cit.* 1929.
[7]Records cited for only 500 miles.
[8]Stoner, D., *loc. cit.* 1935. Mammals only counted.

for I believe that many frogs and toads are overlooked by observers. These forms are comparatively small, they have no outstanding exoskeletal features and their bodies are soft and yielding so that even immediately following death by motor traffic little of the animal remains except an inconspicuous splotch of red or a moist spot in the highway. For this reason also I suspect that *all* counts are probably lower than actually should be the case. If the degree of this deficiency could be even approximated I feel sure that the figures on the *rate* of killing would be materially increased.

Notwithstanding whatever deficiencies may exist in these records, they show that a total of 1,277 dead vertebrates was counted by three different observers on 8,303 miles of highway—mostly paved—extending through rather diversified habitat mainly in the northern half of the country lying east of the Mississippi River. This is an average of .153 casualties per mile, more than six times the average destruction recorded by Dreyer, but approximately one and one-half times less than the average for the writer's 1935 trip and about two and four-tenths times less than for his 1925 figures from Iowa.

In the light of the previous discussion the average of .153 vertebrate casualties per mile probably more closely approximates the truth than any one of the trip records cited. From my own observations over a wide territory within the past ten years I am inclined to believe that an average daily motorcar casualty list of something more than 200 vertebrates per 1,000 miles of main traveled highway is a fair approximation of the true conditions which prevail during summer and early autumn.

Whether this situation prevails throughout the country as a whole we have yet to learn. That it does not prevail during spring and winter in the Northern States at least, can not be doubted. But it is questionable whether we are justified in applying the current findings of vertebrate death rates on a per diem basis to the 750,000 miles of improved roads throughout the United States.

As suggested by Dreyer[9], "The rate of killing may vary greatly from year to year, and also within a single season, probably in relation to marked departures from the normal temperature, humidity, and precipitation, or in relation to seasonal activities of the animals." Without doubt this is true. Such details then, as breeding habits, time of molt, imminence, direction and abundance of the food supply from nesting places, the gregarious tendency or lack of it, extent of diurnal or nocturnal wanderings as well as a host of other and possibly incidental factors also probably play an important rôle in the results that we obtain.

However, Dreyer's theory that hot, dry summers produce "a restless, exploratory activity" on the part of animals thus causing them to wander and bring them more in contact with highway traffic is not borne out in the findings recorded in Table 2. For example in the "hot, dry" summer of 1933, Davis recorded 64 mammals on 500 miles of highway (.128 individuals per mile), while in the torrid summer of 1934 the writer recorded 66 mammals on 1,063 miles (.062 individuals per mile). In the more "normal" summer of 1935 the writer recorded 192 mammals on 2,158 miles of highway which is at the average rate of .088 individuals per mile. Essentially the same results are to be noted among the birds and reptiles as recorded by Davis for 1933 and those of the writer for 1935.

As pointed out above, Dreyer's records for 1935—a "normal" season—are considerably lower than those of Davis for a hot season,

[9] *loc. cit.*, 439.

or of the writer for another hot season (mammals only compared), or of the writer for the same (1935) season.

After all, in view of the rather limited amount of information that we have on this subject, we are scarcely justified in drawing too widespread and sweeping conclusions. We are not ready for elaborate theorizing or broad application of our findings to a large territory. Let us carefully and conscientiously *amass* the facts and findings, leaving the matter of speculation in the distant, inconspicuous background of the picture.

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New York State Museum,
Albany, N. Y.

JOHN MARION PRIOUR

BY FREDERIC H. KENNARD

John Marion Priour died March 14, 1931, at Corpus Christi, Texas. While never a member of the American Ornithologists Union, he had been so closely identified with a number of the ornithologists of this country, as guide, camping companion, or collector, that some notice should be taken of his passing.

His father, Gene M. Priour, was born in Rennes, France, in 1812, and came to this country in 1836, landing at Mobile, Alabama. His mother, Rosalie B. Hart, was born in Wexford County, Ireland, in 1825, and brought to this country by her parents in 1834, with a party of colonists, who landed at Copano Bay, a few miles north of Corpus Christi. Her father having died of cholera, contracted on the ship, she was taken by her mother, after various adventures, to Mobile, Alabama, where she was educated, and later met and married Gene M. Priour in 1844.

John Marion Priour was born in Mobile, Alabama, March 3, 1848; and in 1851, according to his own account, "was brought to Texas and landed on the beach at Corpus Christi Bay." Here his family settled and young Priour, growing up (there were seven brothers and sisters) in what was then a frontier town, seems to have turned his hand to various pursuits.

Starting at the age of nineteen as a clerk in a grocery and dry-goods store in Corpus Christi, he later spent a couple of years in his employer's interests in Mexico, whence he returned to take charge of his father's ranch on the Aransas River.

For the next few years he seems to have led the frontier life of those days, looking after his father's ranch, driving cattle to market, sometimes to Louisiana; and writes that he "was with the Volunteer Rangers six years at the time our pistols were the law, judge, and jury". At one time he worked as engineer on a new railroad that had just been built from Corpus Christi to Laredo, and then learned the trade of carpentry.

On October 1, 1877, on one of his trips to Louisiana, he married Margaret Elida Wanning, of Morgan City, Louisiana, daughter of Horatio and Ora Wanning, and brought her back to Corpus Christi, near which they made their home. Mrs. Priour died on September 10, 1916. They are survived by one son, John W. Priour of Hebbronville, Texas, and two daughters, Mrs. J. W. Roark of Corpus Christi, and Mrs. J. W. Cunningham of Callalen, Texas.

While Priour was a born hunter and outdoor man, he never seems to have been particularly interested in the birds or mammals around him, at least as a collector, until he was over thirty years old and happened to meet Col. N. S. Goss of Neosho Falls, Kansas. Dr.

Fig. 48. John Marion Priour. 1848-1931.

Frank M. Chapman, who collected with Priour in 1891, quotes an account of this meeting from his "Journal" of March 16 of that year:

"Some morning in 1878 a man who requested a drink walked into Priour's yard with a Caracara and a Marsh Hawk flung over his shoulder. To a hunter these birds were as Vultures, and he commenced to play on the supposed ignorance of his caller, saying, 'You

have some fine soup birds there.' Goss took it in his calm manner, and after awhile, seeing that Priour was really interested, explained why he was shooting such apparently worthless birds. Then Priour told him of birds he had seen, and this led to his engagement as guide."

Just when young Priour learned to stuff birds, and began to collect them and their eggs is not known, but this friendship with Col. Goss, begun so accidentally, seems to have been kept up, and Priour writes that "in 1881, Col. N. S. Goss, of Neosho Falls came to Corpus and we collected and mounted quite a lot of specimens".

In 1882 Col. Goss's brother, Captain B. F. Goss of Pewaukee, Wisconsin, came to Corpus Christi, and was there joined by George B. Sennett, and Priour writes that "we collected from the Rio Grande to the mouth of the Gaudalupe River", and he continued to collect eggs either with Captain Goss, or for him, until 1886, and collected skins for Sennett until 1891.

Col. Goss's collection of mounted birds, originally in the Kansas State Capitol, at Topeka, has been transferred to the Museum of the Kansas State Historical Society, at Topeka. Captain Goss's egg collection is in the Milwaukee Public Museum, although he gave a great many eggs to the United States National Museum at Washington. A good many of Sennett's skins are also in Washington; but such skins as he possessed at the time of his death passed to the American Museum of Natural History in New York.

While the thousands of specimens collected by Priour were invariably labelled with such data as was necessary, he seems never to have thought of putting on his own name as collector.

That Sennett thought a lot of Priour is evident, for Dr. J. A. Allen, in his account of Sennett's life, in the *Auk*, January, 1901, writes: "In this same year (1887) he sent Mr. J. M. Priour to the region of the lower Brazos River, and later to explore the coast region, or Tamaulipan district, of northeastern Mexico. Mr. Priour made a wagon trip from Corpus Christi to Tampico in 1888, amassing large collections, which threw much light on the faunal character of this then little known region, and helped to establish the boundaries of the Tamaulipan Fauna. As the country about Tampico proved very unhealthful, Mr. Priour nearly lost his life there from a tropical fever. The next season, 1889, to enable him to recuperate, and to continue his work in a more salubrious region, Mr. Sennett sent him to the eastern base of the Sierra Madre, where for several months he collected in the

vicinity of Monterey. The results of these important expeditions unfortunately still remain unpublished."

This seems to have been a busy decade for Priour, ornithologically speaking, for, in the spring of 1884 he collected with Joseph L. Hancock from March 16 to April 1, and in 1887 with George B. Benners of Philadelphia, and there were a number of others.

Dr. Frank M. Chapman writes: "I lived with John Priour either at his home or with him in camp from March 16 to April 25, 1891. His striking personality, his knowledge of the country, and his enthusiasm as a collector made my month with him stand out as one of the most enjoyable of my collecting experience."

Dr. Witmer Stone writes me that S. N. Rhoads of Philadelphia, "stayed with him about 1891".

In 1894 there was published by the Forest & Stream Publishing Co. an amusing book by Dr. A. C. Pierce of Boston, Mass., entitled, "A Man from Corpus Christi or The Adventures of Two Bird Hunters and a Dog in Texas Bogs". This was a ludicrous account of the travels and adventures of Dr. Pierce with Priour and his dog, Absalom, on a five-months camping and collecting trip in the vicinity of Corpus Christi.

Dr. Pierce writes that "Mr. Priour was a professional hunter; he made hunting his whole business the year around, and as his jaunts extended in every direction, he was well acquainted with the country for miles about Corpus Christi. He also collected specimens of natural history for various parties, and as my principal object in visiting the country was to secure such specimens myself, I could not have found a man better fitted for my companion."

Vernon Bailey writes that "On April 13, 1900, Mrs. Bailey and I first met Priour and his son at Corpus Christi, and he went around with us for several days on trips to the flooded bottoms of the Nueces River to get Wild Turkeys, and down along the coast and Laguna Madre for water and shore birds. He was a taxidermist and skin collector, and had for years been in the business of collecting plumage for the millinery trade with Armstrong, Watson, and others. He had been with many well-known ornithologists and helped them collect, and knew birds fairly well."

"He gave me many notes on mammals that I used in my Texas report, North American Fauna, No. 25, published in 1905, and later sent some specimens of mammals to the Biological Survey. Most of his notes on birds are included in Oberholser's report on the 'Birds of Texas' not yet published. He was a kindly, helpful friend with the

interests and enthusiasm of a real naturalist. His contributions to science in both ornithology and mammalogy were far more important than some of those that get more credit."

From 1900 to 1916, after the trade in plumage had become pretty much a thing of the past, and collectors were becoming rare, Priour seems to have spent most of his time working as a carpenter, either in Corpus Christi, or in other parts of Texas, building oil well derricks or doing his bit during the war by helping on the buildings for the Army Camp at San Antonio.

After Mrs. Priour's death in 1916, he closed his old home and went to live with one of his daughters.

Mr. N. A. Francis of Brookline, Mass., made successive egg collecting trips with Priour in the springs of 1919, 1920, and 1921. Mr. Francis died on June 19, 1921, and his collection was presented later to the Museum of Comparative Zoology at Cambridge, Mass. He had told me so much about Priour and his delightful personality, that, in February, 1922, my son Bob and I, while collecting along the coast of Texas, stopped off at Corpus Christi for the especial purpose of meeting him, and spent five enjoyable days in his company, exploring the country about his daughter's (Mrs. Roark) place where he then lived, about six miles out of Corpus Christi. Together we tramped the shores of the Nueces River, or sailed down the Laguna Madre to Bird and Padre Islands.

I was so charmed by his delightful personality, his youthful enthusiasm, (he was 71 at the time), and above all, by his kindliness, that we carried on a somewhat desultory correspondence afterwards, even though the old man hated letter-writing. He gave me at the time a number of skins that he happened to have on hand, and later, after I had gotten the necessary permits for him, collected a few birds for me.

The late Walter B. Savory of Wareham, Mass., seems to have been the last one to have gone camping and egg collecting with him, and he wrote that in the spring of 1927, when Priour was 79 years old, "we collected together for some months, Uncle John going with me in my auto and camping wherever we happened to stop. He gave me all the sets he found. I never ceased to admire the natural-born courtesy that distinguished him. It was a privilege to know him."

Modest, unassuming, generous to a fault, always ready to do anything for anybody at any time. I think it was his kindliness that most attracted me, and as an example of this, I would like to tell of one personal incident. It has been the custom, these many years, for my

friends and neighbors to foregather at my home in Massachusetts on New Year's eve, and, together, see the Old Year out and the New Year in. As part of the decorations there is always hanging from a beam in the front hall a sprig of mistletoe. Now mistletoe grows luxuriantly about Corpus Christi, and one day while with Priour, I told him of our custom, and wished that I might have, on these occasions, just such a wonderful clump as we happened to be looking at, to hang in my hall. Nothing further was said about it at the time, and I had forgotten the incident until, a couple of days before New Year's, a large box was received from Texas containing just such a clump of mistletoe. And each year since then, such boxes have arrived. Not only that, but before he died the old man asked his daughter to continue the custom, because I had been his friend.

Newton Center, Mass.

ENDEMISM AND THE AMERICAN NORTHWEST

BY T. T. McCABE

The speculations to which this paper is devoted are based upon the empirical belief that geographic populations of the higher vertebrates are reasonably certain to show endemic variations in proportion to one or more rather vague environmental considerations, such as the homogeneity and individuality of the environment in question, its size, its isolation, or its age. These vague conditions, often more easily perceptible to the casual observer than to the cloistered student of the physical data, somehow actuate or correlate with precise agencies still far beyond our grasp. But throughout the general failure of field ecology as an exact science, especially for land areas, there recurs the stubborn conviction that regions which we empirically sense as natural units are in the vast majority of cases reflected in endemic racial or specific variations of a significant number of the more plastic vertebrate forms. In general, such endemic conformity conveys a sense of distinction from other types of variation of divers historical or genetic origins. It is the basis of the study of incipient evolutionary change in the higher vertebrates today. So reguiar is its occurrence that we are justified in emphasizing the fact and seeking an explanation when a striking exception appears. Such considerations may justify a few paragraphs of rather loose descriptive comment on certain areas of northwestern North America whose conformation and recent history throw light upon the nature and rate of cer-

tain of the phenomena which vertebrate zoologists group under the name of "geographic variation".

The splendors of the northwest coast gain by the suddenness of their beginning, by the dreariness of the stage which the mountains above Vancouver back like an azure drop. The delta of the Fraser River, in the immediate foreground, is one of singular lack of interest. Southward, the long straight coast from Cape Flattery to San Diego is for the most part in an unsatisfactory state of middle age, without the savagery of geologic youth or the gentler beauties of alluvial maturity. Over and over again the elements recur, bulky headlands and "haystack" off-shore rocks of yielding conglomerates and sandstones, too weakly sculptured by the trampling Pacific and the deluges of the fog-belt, narrow barrier beaches, and small lagoons of little charm.

Over a thousand miles of such reiteration ends in the gateway whose pillars are Vancouver Island and the southern shoulder of the coast range, where the mountains withdraw from the measureless embrace of the North Pacific—where the offset and break occurs between the Coast Range and the Cascades. Perhaps no one has had the audacity to calculate in miles the length of the shore line of British Columbia. Farther south, a thousand miles has meant more than the Pacific coast of the United States. Now it is not impossible to follow such a length of ragged shore, of polished rock steeped in clear sea water, of tortuous inlet and island, and find one's self again at the starting point. The coast from Vancouver north is perfectly unlike anything else on the continent.

Regardless of underlying geological distinctions, the surface of the new setting is dominated by a single theme. Rising through the accidents of the present landscape, obscured but never lost under sheltered forest or wind-racked scrub, the ice-motive is never absent. From the fringe of "boat-bottomed" rocks, rounded and polished until they seem to float foam-like on the surface of the water, to the peaks whose scoured crowns are hardly shadowed by the patina of oxidation, there is the sparkle of fresh stone-cutting. The unfinished masonry lies as over a holiday. The complete transformation in topography and physiography coincides with the southern extension of the Cordilleran ice-cap.

The dreaded off-shore wind is the breath of retreating ice and carries a sinister promise of return. Withdrawn to the cirques and cols, flashing blue and green where the thin sunshine and warm winds maintain, for the moment, something better than a state of equilibrium

FIG. 49. Numbers of endemic birds in certain regions. Upper numbers represent species, lower numbers geographic races.

with the ponderous ice-creep, the ancient foe remains imminent. The fate of an epoch may hang very delicately in the balance, the little more or little less serving to turn the climatic scales. Let the cold breath sharpen ever so little, let the snowfall gain imperceptibly on the melting and evaporation, and the random cannonading of the slides will swell with the sounds of a main advance. New offspring of the ancient ice will press down the darker gorges to meet and accumulate until a single pale declivity, pierced by rare wedges of naked rock, slopes westward from the mainland peaks to over-ride the outer islands and resume the old line of equilibrium with the warm sea.

But for the day at least the omens are favorable. Life is in the ascendant, and promises, before a new retreat occurs, to effect the conquest of new territories and found new dynasties of living things. In this living promise lies the charm and inspiration of the new environment. For the most part, what we call natural history is, in point of fact, an oppressively finished and static affair. For us, the great changes belong to a realm of ideas rather than to reality. Here, on the contrary, dwells a sense of unfinished surroundings, of obvious and creative change. Something of the expectancy of the northern spring lingers in this greater springtime of a reviving age. Life presses in, with a roster of forms which, intelligently read, tells the story of the immediate past almost as clearly as does the geology—a seemingly chaotic aggregation, which, the key once found, falls into order with startling completeness, while the degree to which the new environment has impressed its stamp upon the pioneers offers one of the most illuminating lessons of the geography of life.

Since during Recent time the sea level has been such as to make low-lying islands of the outer foothills and plateaux of the coast range, the withdrawal of the ice first revealed a fringe of naked stepping stones, destitute of life or the promise of life, larger copies of the offshore reefs of today. There were here no gathering grounds for till or drift, which was washed directly into the channels. No plant could live unless upon air-borne nourishment. Yet mysterious agencies serve to repopulate even such desolate spots with surprising speed. Coming we know as yet neither how nor whence, mosses and alpine plants found nourishment in the dust of lichens and water-borne organic matter, washed or blown into crevices. These laid down their own soil as they advanced, and so, stage by stage, type by type, the present incomplete vegetation has been attained. These suggestions of newness and incompleteness are by no means intended to be fanciful or figurative, but to describe a condition as concrete as the

stage of reversion of a plowed field or the scar of an avalanche. In the interior of the outer islands are great fields of polished rock where the rate of blanketing by felt-like mats of half-rotted vegetation might be measured, year by year, flat wandering drainages where rock pools need the increment of a few more years or centuries to become bogs, well-sheltered areas of cedar and hemlock scrub waiting the slow accumulation of more soil to become cedar and hemlock forests and to offer their hospitality to spruce and balsam. At present monotonous forests line most inner shores, while the rest, hidden, like the white outer beaches, from travellers of the "inside passage", offers a meager foothold for hemlock, cedar, and yew. These cover the bulk of the outer islands with grey skeletons of dwarfed forests, valueless, lacerating, often impenetrable, which reflect the tones of the changing northern days with unearthly radiance, and are not less haunting in form than the dreadful thickets which Dante animated with the souls of suicides.

The living pioneers, selective products of so bitter a history, yet fall heir, in a sense, to all that the latitude can bestow. The fragments of scoured rock, in the shadow of the withdrawing ice, lie also fair in the path of the western wind drift or Japanese current, whose warm waters surround them, are deflected north and south by their shores, and cast upon their beaches a flotsam of bamboo and tropical woods and the lost gear of old-world fishermen, so that Siwash children play with glass balls that once floated Japanese nets. As the waters bring warmth so the sea winds bring rain, warm and moderate compared to the cold deluges which, like grey curtains, shut off the mountainous inner islands. In spite of edaphic poverty the stepping stones of crude rock have become gardens of the gods.

As compared to what lies south of the ice-cap glaciation, and incidentally south of the international boundary, the flora is different enough in the species involved, but profoundly different as to emphasis, distribution, appearance,—that general character so apparent to the eye but so difficult to analyze and define. Numbers of forms are small. Even the color and luxuriance of the outer "muskeg" islands in early summer covers a numerical poverty which reaches its extreme on the outer mainland. The disgusted Oregon timber-cruiser who returned from miserable days in the sodden forests of Queen Charlotte Sound to report nothing but "salal trees and cedar brush" was guilty of exaggeration, but the picture of rough slopes with stunted cedar half-buried in *Gaultheria* and *Vaccinium*, animated with

the songs of *Hylocichlas* and little else, the underlying sphagnum or naked mould shining with the trails of giant slugs, represents a vast zone of nook-shotten coast line.

Because the basic workmanship is more exposed, the brilliant newness of the coast is more spectacular, more suggestive of the terrestrial springtide, than that of the adjacent interior between the Coast Range and the Rockies, which, in its present aspect, is perhaps actually younger. The intricate coastal sculpturings of hard diorite and granodiorite are more strange than the piles of tortured glacial drift, the eskers, morainal dams, and clean-cut benches of the interior, which in turn are better concealed by a vegetation that found fertility and shelter ready-made, as well as surroundings and an atmosphere which made possible high extremes of summer heat. The reclaimed areas offered a wider range of hospitality to the plants and animals which pressed upon the southern front. The various changes, as the habitable frontier moved northward, were less abrupt and less fundamental.

Here, between the mountains, and north of the southern limits of glaciation, stretching far into northern British Columbia, lies an anomalous plateau country, full of familiar elements but in its entirety quite unlike prairies, mountains, or coast,—high, rather flat, very cold in winter and hot in summer, a land of sparse aspen and lodgepole pine shading into balsam and spruce on the eastern and western mountain rims, dotted with shallow lakes, sometimes of great size, and studded with a few clusters of small volcanic peaks. Here to northward lay the gathering ground of the Cordilleran ice-cap whose smaller arms created or deepened through-valleys westward to the sea such as those of the Kleena-Kleene, the Hotnarko, the Skeena, and the Stikine, and extended its terminal forks southward to excavate, with their swifter flow, such gorges as those of the Columbia and the Chelan. Here the landscape of the ice age was that of interior Greenland today. The burden of ice rose to a level of from six to seven thousand feet above the sea where, from peak to peak and range to range, its flood is marked by a transformation of topography. Elevated, refrigerated by the eastern and western mountain rims, unaffected by the Japanese current, the plateau ice lingered and lingered. Johnson and Uglow's intensive study suggests that the glaciers of the foothill valleys of the Cariboo district have been absent only some fifteen thousand years. So much of the recent work on the chronology and paleontology of the pleistocene has dealt with parts of the United States where actual glaciations were rare and widely-sundered epi-

sodes, that their actuality, duration, and significance in the biological history of the north has not been understood.

It is not necessary to possess the intuition of a G. M. Dawson, or to be steeped in the data of the Canadian Geological Survey in order to read one fact from the landscape of British Columbia, viz., that during the late Pleistocene the region was uninhabitable by most of its present land vertebrates. We may leave the question of a scant handful of extreme "arctic-alpine" forms open to doubt—it need not concern us here. One corollary follows—that the present inhabitants must have arrived by migration in their present guise, or varied *in situ* since the change of climate.

If we use the word *endemic* in its present accepted sense of *restricted to*, though not necessarily indigenous in, or originating in, then the lighter the endemic variations in newly available and sharply differentiated regions, the more likely they are to be indigenous and of post-Pleistocene development. It is at least unthinkable that a group of animals or birds showing a roughly corresponding degree, and, especially, a parallel *type* of variation, should as a unit, with the change of conditions, have transferred their common range to a new region which bore no resemblance to their previous habitat.

One impressive fact stands out from the accompanying map. In the British Columbian region, a sharply-defined natural unit, rich in light endemic variation, *endemism of specific degree practically does not exist*, in contrast to all surrounding areas. Only the Northwestern Crow (*Corvus caurinus*) still rated, undoubtedly wrongly, a race of the *brachyrhynchos* group by orthodox ornithology, and extending its present range to Prince William Sound, is a candidate for specific near-endemism. This bird, by a fortunate chance, happens to be the only one in North America which can be shown by paleontological evidence to have at least withdrawn its southern extension, since the later Pleistocene, from southern California to Puget Sound, and which very probably is an immigrant endemic rather than an indigenous one in its present range.

Be that as it may, in the possession of endemic forms the contrast of the British Columbian and southern Alaskan coasts with both the north and the south are obviously overwhelming and must have a reason. Today, in the United States west of the Rockies and in Lower California there exist at a minimum estimate some forty endemic species and 243 races, variously distributed. At the opposite extreme, in the

far northwest, warm *unglaciated* western Alaska and its islands offer as sharp a contrast and a more surprising one. Here is all that is left of the faunas (for there were probably at least two rather distinct ones) of the great Tertiary landbridge, hundreds of miles in width and diverse in climate, which joined the continents, and is now the floor of the shallow Bering Sea. It is true that an undue proportion, though not all, of the fifteen endemic species are littoral or even pelagic, but of the thirty-three largely terrestrial endemic races a large number are extremely strong, relatively nearer specific rank, in contrast to those of the more southern coast or the British Columbian interior. The region is a rich pocket of relatively deep-seated endemism—an ancient, almost relict, fauna, strangely surviving in a strange retreat.

When, however, we turn to the obvious interpretation, i. e., that the explanation is historical and lies in the time factor, that the degrees of endemic variation more or less accurately represent the length of endemic habitation of the populations involved, we are faced with an apparently flat negation in the fact that the eastern glaciated regions, from the Rockies to the Atlantic, are by no means equally deficient in endemic forms of specific rank. I believe, however, that the difficulty is less stubborn than at first appears. Dangerous as it may be to give free rein to the imagination in matters so out of reach of experience, careful consideration must lead to the conclusion that the present distribution of endemism is strikingly in accord with the probabilities, and offers extraordinary insight into the nature and rate of variation.

Over the monotonous eastern landscapes, as the ice came and went, we must imagine sweeping and unified migrations of coherent populations of animals and plants, drifting northward or southward rank by rank, each enclosed within its drifting environment. The movements were over a comparatively uniform terrain. Topography ran north and south. Change crept northward in a cycle of repetitions. Over broad steppes, along sea coasts, up the spine of the Cordillera, the footsteps of change, gradual or rapid, continuous or intermittent, followed relatively simple paths. Transitions, as between the Sierras and the Cascades, barriers, like the vanished lakes of the Pleistocene, were inconsequential or fugitive. Each zone reclaimed from the ancient frost was suitable for settlement by the life of its southern margin.

On our rocky northwestern fringe there was no duplication and reduplication, no moving up of ready-made environments. Here the old

life faced new conditions. The renaissance began at the margin of a new physiography. Major climatic and topographic boundaries had chanced to coincide. Reclamation began where coast, mountains, and interior are transfigured, at the gateway of the northwest, where the mountains turn westward to plunge their spurs and valleys into the sea, or where, in the words of Dawson, the coast system "replaces and partially overlaps" the Cascades. Nothing like the new shore line had existed elsewhere; even the inter-mountain region was strongly differentiated.

What took place over the relatively uniform east with the passing of the Late Pleistocene is seductively easy to visualize; what took place over the complex west, very difficult—so difficult that we may never extricate the history of the individual animal forms. To illustrate the distinction, we may venture, with the eye of the mind, to pierce the darkness as far as the so-called Wisconsin glaciation and to glimpse, near the ice-front in the middle west, something over twenty-five thousand years ago, some characteristic scene—perhaps a round sphagnum muskeg, bordered concentrically with grass, willow, and alder, and backed by dark conifers, beyond which rises a rolling landscape of windswept grass and evergreen scrub. A group of caribou, circling with clicking hooves and muzzles stretched high, have been roused by a shift of wind. A moose, seen in vague outline through the willows, shakes and snaps the long shoots on which it feeds. So far the setting has left its record, for those to read who can. But we may quite safely people the stage with other actors of whose presence no trace remains: the deeper forest with White-winged Crossbills and Three-toed Woodpeckers, the forest edge with Yellow-bellied Flycatchers and Canada Jays, the deciduous brush with Tennessee, Cape May, Myrtle, and Blackpoll Warblers, while the royal crimson of the sphagnum is enhanced by a dotting of Rusty Blackbirds, walking their long patrols, their bills bristling with insects. In the distant landscape there are sites, in the open grassland, for the nests of Sprague's Pipits and Smith's Longspurs, in the scrub, for those of Harris's Sparrows.

Such a picture once established, in part by the sciences which deal with the animals and plants of the lost ages, in part by inference from present association, we seem at liberty to shift the scene northward, step by step, age by age, until, time and space converging, we meet the present reality in northern Manitoba or Saskatchewan. No radical and lasting changes in topography have been passed over, no

more subtle changes, insurmountable to the animals in question, need have intervened.

It is true that we too rarely have among the smaller mammals, and practically never among birds, adequate fossil evidence of such migration by unchanged living forms. But all that we do know or guess of the rate of mutability of vertebrate species forbids us to believe that such profound modifications in the germ line as exist among Canadian endemic species east of the Rockies can have come to pass in the region of their present sojourn and in the short period since the glaciated regions became habitable. Whether such forms evolved before or during the great stretch of the Pleistocene, whether far to the south, or even farther north during some interval still warmer than the present, or whether, more probably, the more recent process of evolutionary changes were never localized but protracted through long cycles of drift, such as still continue, though too slowly to be reflected in our brief records, we may never know. But of one thing we may feel reasonably sure, that of the many *species* now endemic to regions of Pleistocene glaciation, very few, if any, can be the exclusive products of their present geographic range.

On the Pacific slope, in the same latitudes, we cannot conjure up such a scene of the diluvial drama which, actors and setting unchanged, is reproduced today on the northwestern stage. Here our mind's eye must look back upon an ancient southern fauna trapped in a disappearing, rather than a migrating, environment. The questions are rather what forms will have the vigor and tolerance to escape, the plasticity of behavior or form to undergo adaptation. The tolerance of many forms from many directions enabled them to penetrate and gain a foothold in the new regions. Hardly a single form was prepared to adopt it as an exclusive unit, to become endemic to its natural boundaries.

Then, as now, we can not doubt the existence of essentially coastal forms in the south, narrowly fenced between the Cordilleran barricades and the sea, and subjected to specialized environments. But the shadow of change, passing quietly from latitude to latitude, from level to level, produced little orderly procession of such forms. No ancient form found its environment reproduced in the virgin northwest, and indeed relatively few possessed the catholicity to include its new and singular habitat types in their adopted ranges. Many, as both deductive reasoning and avian paleontology suggest, disappeared with their surroundings. Relatively few, and these practically all from the southern seaboard, were capable of accepting the novel extremes of

the new coast. In consequence, the breeding forms of the British Columbian coast hardly number half of those which occupy almost any strip of corresponding size in the interior of the province.

The avian population of the interior of British Columbia, on the other hand, instead of being composed of scattered gleanings from a single source, as on the coast, is relatively large and the result of invasion of three great geographic groups, those of the far north, the Great Basin and Rocky Mountains, and the east. This is the no man's land of the grand strategy of distribution. Like the coast, it lacks deep-seated endemic differentiation, native or immigrant. Unlike the coast, it exhibits the most meager indications of incipient geographic variation. Over 70 per cent of the population is composed of forms which find their present centers of distribution in the far north or southward in the Great Basin. Embedded in the same mosaic is a smaller but strangely distinct component of eastern races or species, which here, just above the southern limits of glaciation, suddenly strikes through the Rockies and the intermountain region, often as far as the Coast Range. For a long time I stood somewhat in awe of this group of familiar eastern creatures in such unfamiliar surroundings, so indifferent to the tangible and intangible barriers of topography and ecology. So bold an alien vanguard, it seemed, must herald a mysterious faunal movement, be fed by hidden springs of vitality, and contain secrets of faunistic revolutions of the past. But if we regard the population as the mixed product of recent invasions and of centripetal force, it is obvious that the adjacent east would have contributed its fraction, especially of kinds of birds to which mountains and boreal forests constitute avenues rather than barriers. Such a variegated faunal complex, once we accept the historical viewpoint, needs no explanation other than recent and heterogeneous origin. It is the selective result of throwing open virgin territory to settlement on several frontiers. The mixture as a whole lacks local color, for local color is slow to appear. In the crucible of the natural environment reactions are deliberate indeed.

Inherent in such a situation lies the framework of a great experiment in the rôle of environment in organic evolution. There was waiting not only a *tabula rasa*, an empty stage, but one dissimilar to any previous and ill-adapted to carry on old themes of remote origin. The results of the re-occupation are to be read in new themes, in those incipient changes or "geographic variations" which probably differ

only in degree from more trenchant "species", and to which younger vertebrate naturalists are inclined to look as the lowest perceptible evolutionary points of departure. The time of re-occupation, also, is fixed. Because for a long period most of the north was almost empty of vertebrate life, the length of the local habitation of the present occupants can be measured. Granted the responsible agency of environment, we can, like chemists, determine the rate of certain evolutionary reactions, even if we must guess at their mechanism.

Certainly in those regions whose character and position in the present natural cycle we are trying to grasp there have developed only those hints of change, tantalizing fugitive variations, shades too delicate to endure a change of light, dimensions so confused that only long series and the subtleties of mathematics can evaluate them, which the science of vertebrate systematics has struggled to reduce to a single category, the geographic race. Of such variations no study can be too minute, for the chances are large that in them we see eternally repeated the very birth of organic evolution, but it is quite certain that no system of ponderous trinomials will ever convey a sense of their delicate and imponderable values, which we now understand to include innumerable degrees, from near-specificity down to faintly divergent behavior and physiology in groups otherwise indistinguishable, even to the change of a note in a song between colonies a few miles apart and otherwise beyond the discrimination of human sense or scientific apparatus.

I do not suggest that while "species" may have evolved elsewhere (or nowhere exclusively), "races" must have developed where they are today, or propose any equally rigid and absurd distinction between the categories. On the contrary, it is almost certain that many strongly differentiated races, as, for instance, certain of the endemics of the eastern glaciated areas, must antedate the renaissance of the regions they occupy. But the more superficial the variation appears, the greater the probability of its local development. The endemic variations of the northwest coast are uniformly light. Furthermore, their most spectacular aspect, as a group, is their parallelism. An overwhelming proportion are darker, of a more "saturated" pigmentation than surrounding races, while size is almost as regularly diminished. One or more localized modifying factors, whatever their means of operation, of common application, to which many of the native forms show strikingly parallel responses, obviously exist in the new envi-

ronment. The lightness of the differential characters, their striking parallelism, their sharply endemic grouping, and above all their occurrence in a region so recently uninhabitable and so completely without evidence of immigrant endemicism in ancient and trenchant forms, *leaves little doubt of the local origin* of the variations. Such a conclusion carries in its train the establishment of a somewhat more-than-minimum period, if not yet in years at least in a very small division of the geologic column, for the development of distinct, morphologic, geographic races. Furthermore, it seems highly probable that the contrast between coast and interior in British Columbia as to prevalence of geographic variation indicates a further correlation with the relative lengths of the habitable periods in the two zones, which has already been discussed.

For many years large groups of vertebrate zoologists have blindly concentrated upon the description of geographic variation. Hardly a thought has been wasted on the rate of such change, and indeed there is little basis for speculation upon it. Yet the phenomena of widespread glaciation, when subjected to such chronological studies as those, for example, of Antevs, and knowledge of the age of certain islands which have been submerged and re-elevated, provide data which is certain to be collected and applied effectively to such problems.

On this continent Hay, interpreting the riches of mammalian paleontology, guardedly admits the possibility of differentiation into species since the *beginning* of the Pleistocene, almost certainly over a million years ago. The span of the whole Pleistocene, as compared to the recent, was immense, and if we may feel assured that Recent time, say, in the regions under discussion, following the strong consensus of modern geological opinion, something over 25,000 years, is sufficient to have produced the lesser geographic variations, such a point of view as Hay's supports what many devotees of vertebrate research believe, that there is a vast interval between the first emergence of perceptible morphologic "geographic variation" and the "specific" stage when ready interbreeding ceases to take place in nature.

In this attempt to locate, in place and time, certain starting points of potential evolutionary changes in one class of vertebrate animals, I have coupled the words environment and variation as though such coupling, as cause and effect, were a foregone conclusion and a comprehensible one. But in so doing I have followed the common working hypothesis rather than clear-cut principles, and have restricted myself to the consideration of that phase of very gradual variation based

on geographic series which has been so much emphasized in the study of the higher vertebrates but is so difficult to isolate in other fields, notably in that of botany. Its recognition does not deny other and older genetic evolutionary mechanisms which are unfamiliar in the vertebrate field.

In respect to this working hypothesis of the study of distribution, we flounder in dark waters, snatching at straws and dropping them, straining for doctrines only to revolt from their far-fetched inadequacy. The life sciences are approximately as far as ever from showing how external agencies can create heritable changes in organisms. To ask selective adaptation to account for the minute and inconsequential variations of geographic races is to reduce the theory to absurdity. To believe that such variations are "linked" to others more important, but unfortunately quite invisible, is one more step in the same direction. The vertebrate geneticist looks not at the nature of the environment but at the degree of its isolation, especially if combined with small size and reduced numbers, or to contacts of adjacent groups for the origin of strains of a mutative origin and Mendelian behavior, a doctrine which has only far-fetched answers for our increasing knowledge of the parallelism of variation in local populations, of which the northwest coast offers a fine example. The form of agnosticism which takes refuge under the name "orthogenesis" would perhaps free itself, if it could, from all environmental correlations. Because science finds no mechanism for the operation of direct environmental influence upon racial morphology, it has devoted great ingenuity to eluding the evidence of it. Yet naive acceptance of an almost universal sensitiveness to the environment *per se*, as opposed to mere isolation, of the parallel effects of parallel environments, and of the early development of differentia independently of selective value, seems the attitude most likely to lead at last to the center of the bitter problem of the origin of races, and therefore of species.

Museum of Vertebrate Zoology,
University of California, Berkeley, Calif.

FURTHER NOTES ON THE CONSTANCY OF CATBIRDS TO MATES AND TO TERRITORY

BY GEOFFREY GILL

In the WILSON BULLETIN for June, 1935 (pp. 104-106) I presented an article in regard to the attachment shown by Catbirds (*Dumetella carolinensis*) to mates and territory. The data in this previous article were collected during the summer seasons of 1932, 1933, and 1934. Two more years have rolled by and while individuals of this species have been known to live longer than five years, it is thought that the average life span of these birds is seldom much more than five years, and in all probability is less.

At this time, I wish to record the data collected in the past two summers in relation to a male Catbird, which for convenience was named "6M32" in the former article. This bird nested on Territory 6 in 1932, and in 1933 it nested twice on Territory 1, with different mates for both the first and second nestings. In 1934 "6M32" remained constant to Territory 1, and while both the early and late season's nests were built there, 6M32 again changed mates with each nest. At the close of the third season, this male had been constant to the same territory for two seasons and four nestings out of five, but had mated with five different females. In 1934 6M32's last mate was No. 34-142811, marked with colored bands.

For the sake of the records, it can be noted that this female has never occupied Territory 1 since, although she appeared in our traps at the close of the nesting season in the following year, and again on May 4, 1936. No. 34-142811 probably nested during these two seasons at some distance from the banding station, as her nests or territories were never found.

During May, 1935, Territory 1 was watched very closely in hope that 6M32 would be found there again. On May 15, two very wary birds were found on the territory. As appears usual at such times, the one believed to be the male kept to the tops of the trees while singing, making the observation of colored bands, even with glasses, difficult. 6M32 is recognized by a blue band on the right leg and a red band over the usual survey band on the left.

On May 26, the nest was located containing one egg, but three Catbirds were present. One of these was No. C-144294, color banded as a fledgling in 1933, and which returned the previous year on June 4 but was never seen or trapped after this occasion. It is interesting to note that the mother of this two-year-old "interloper" was 6M32's first known mate, but was sired by her second known husband.

The two other birds were afterwards found to be the resident pair. The female, No. 31-142816 was banded the previous year with colored bands on June 24. This bird had been retrapped by us on May 13, 1935, and her colored bands checked. The male appeared to be No. B-165487, for he carried a red band over the usual survey band on the left. The right leg was bare of bands. Such identifications by colored bands are checked and checked again. Repeated visits to this territory brought matters to the same visible conclusion. The male was banded with colored bands as an adult on May 11, 1932, and was considered an old bird. His presence in the light of previous records was hardly accountable. All efforts to trap him failed and his record proved that he had never been trapped since banding.

On June 15, the four young were banded and two weeks later the territory was deserted.

Before going further, I wish to emphasize the colored banding of the male found in 1935 on Territory 1 and the colored banding of the male expected there after being constant for two years. 6M32 has a blue band on the right leg and a red band under the survey band on the left. The 1935 male had no band on the right leg and a red band over the survey band on the left. Both birds were banded with colored bands in 1932, three years previous to this time. Many workers, who have used colored bands on birds, have found that they are not always reliable after the second year. In the light of the revelations of 1936, this thought should be borne in mind.

On May 11, 1936, the female which had occupied Territory 1 in 1935, appeared in our traps. Her colored bands were all right and it was soon found she was nesting on Territory 1 again. The male, as usual, was difficult to see. Finally the nest was located in a small cedar directly back of the spot used as an observation post. A close approach to the nest brought both parent birds near, fearlessly scolding, as is characteristic of the species. The male had a red band on the left leg, but the colored band had telescoped over the survey band so that it was impossible to know if it belonged above or below the band. Sight identification was hopeless. It might be either of two birds.

We set traps to catch the male but they were evaded. On June 6 we caught the female again, and on June 12 we banded the four young fledglings. On June 17 the male was trapped. It was 6M32.

6M32 had lost the blue band from the right leg and the red band had expanded so far as to be almost dropping off. New colored bands replaced the old ones and off he flew. Both birds of this pair were

checked around Territory 1 to the end of June, when they apparently moved away. It is doubtful whether there was a second nesting in this spot in 1936.

It appears probable, although it can not be proved, that the male on Territory 1 in 1935, might have been 6M32.

If this can be assumed, then 6M32 had six different mates in five years. He was constant to one territory for four consecutive summers and six nestings. During the first four nestings on his favorite territory he had four different mates, but in the last two years, as he grew older, he had only one nest each season and was always faithful to the same mate.

HUNTINGTON, L. I., N. Y.

BIRD NOTES FROM THE LAKE FRANCIS REGION OF SOUTHERN MINNESOTA

BY IRA N. GABRIELSON

Two weeks during August of 1915 were spent by the writer at Lake Francis and Lake Elysian in southern Minnesota. The town of Elysian is situated in a narrow neck of land lying between Lake Francis and Lake Elysian. Both are comparatively small bodies of water, Lake Francis being the smaller and the deeper, the other being a larger and more shallow lake.

Birds were very abundant as individuals although the number of species noted was rather limited. The list as it is, is published in the hope that these notes may be of some value to anyone working on the birds of this region.*

PIED-BILLED GREBE. *Podilymbus podiceps.* This grebe was very common, especially on little pools and swamps adjacent to the lake, but not connected with it. It was not observed on Lake Francis, but there were numbers on Lake Elysian.

BLACK TERN. *Chlidonias nigra surinamensis.* A common species noted every day during my stay. Numbers of them were commencing to change into the white plumage. Spotted and pied birds were observed on several occasions.

*Editor's Note. This paper was submitted before the publication of the Revised A. O. U. Check-List. It was set up in the original, old Check-List order, with certain corrections in the nomenclature. The insertion of the subspecific appellations in the vernacular names has not seemed to the Editor to be sufficiently vital to justify resetting of so many lines. In justice to the author it should be said that they were marked in the returned proof.

Blue-winged Teal. *Querquedula discors.* A small flock of half a dozen birds were seen almost daily around the north end of Lake Francis.

Bittern *Botaurus lentiginosus.* A few individuals remained about the western side of Lake Francis where there was a small growth of water plants. It was also observed on numerous occasions on Lake Elysian.

Least Bittern. *Ixobrychus exilis.* One individual was noted on August 24 on the shore of Lake Elysian.

Great Blue Heron. *Ardea herodias herodias.* There was evidently a roost of Great Blue Herons somewhere in the vicinity as scattered individuals were found everywhere throughout the district.

Green Heron. *Butorides virescens virescens.* Another common species about both lakes.

Black-crowned Night Heron. *Nycticorax nycticorax hoactli.* This species was more common than the last .

Pectoral Sandpiper. *Pisobia melanotos.* Several flocks of Pectoral Sandpipers were observed on the shores of Lake Elysian on August 14.

Solitary Sandpiper. *Tringa solitaria solitaria.* One individual noted on Lake Elysian August 24.

Spotted Sandpiper. *Actitis macularia.* This little sandpiper was common during the entire two weeks of my stay.

Killdeer. *Oxyechus vociferus.* Most abundant shorebird of the district at the time of my visit.

Ruddy Turnstone. *Arenaria interpres morinella.* While fishing from a sandy point on Lake Elysian on August 13 a Ruddy Turnstone was observed near by. It stayed about for some little time and was quite fearless, approaching within thirty or forty feet on several occasions as it fed along the shore line.

Bob-white. *Colinus virginianus virginianus.* I was somewhat surprised to find the Bob-white as abundant as it was in this district. While we had them at Marshalltown, Iowa, about one hundred miles to the south, they were not anywhere nearly as abundant as they were at this point. There was considerable brushland about the lake shore and this may have been effective in affording them more shelter and food in severe weather than could be obtained farther south.

Mourning Dove. *Zenaidura macroura marginella.* The Mourning Dove was one of the common birds of the district.

Marsh Hawk. *Circus hudsonius.* A fairly common hawk in this country.

Sparrow Hawk. *Falco sparverius sparverius.* The Sparrow Hawk was another common bird at this season. I saw numbers of them every day during my stay.

Short-eared Owl. *Asio flammeus.* Another fairly common bird. One pair which frequented a swampy spot near my cottage, was observed every day and others were seen on various occasions.

Screech Owl. *Otus asio naevius.* Two Screech Owls were found sitting in a small fir tree on August 12, on the shores of Lake Francis.

Black-billed Cuckoo. *Coccyzus erythrophthalmus.* This bird was observed several times between August 14 and 24 in a small patch of woodland adjoining my cottage on Lake Francis.

Belted Kingfisher. *Megaceryle alcyon alcyon.* A common resident about both lakes.

Downy Woodpecker. *Dryobates pubescens medianus.* A common resident of the wooded tracts about the lakes.

Red-headed Woodpecker. *Melanerpes erythrocephalus.* The Red-headed Woodpecker was one of the characteristic birds of the district as it is of many parts of the northern Mississippi Valley. Their bright markings and noisy ways make them very conspicuous wherever they are found.

Northern Flicker. *Colaptes auratus luteus.* The Northern Flicker is as common and conspicuous as the preceding species.

Chimney Swift. *Chaetura pelagica.* Noted on August 11 in the town of Elysian. It was not noted at other times.

Ruby-throated Hummingbird. *Archilochus colubris.* Very common about both lakes during my entire stay. A row of scarlet sage near a neighboring cottage was a great attraction to them and I have seen as many as a dozen at a time hovering about this hedge of flowers.

Kingbird. *Tyrannus tryannus.* A very common and conspicuous bird in this district.

Wood Pewee. *Myiochanes virens.* One or more pairs had nested in a small piece of woodland near the cottage and they could be seen or heard at any time during my stay.

Prairie Horned Lark. *Otocoris alpestris praticola.* This bird was common in the stubble fields and pastures about the two lakes.

Blue Jay. *Cyanocitta cristata.* One pair remained about the timber near the cottage.

Crow. *Corvus brachyrhynchos brachyrhynchos.* An abundant species.

Bobolink. *Dolichonyx oryzivorus.* Bobolinks were very common in suitable places. Most of those that I saw during my stay had already changed to the winter plumage.

Cowbird. *Molothrus ater ater.* Cowbirds were numerous in the mixed flocks of blackbirds which roamed over the country.

Yellow-headed Blackbird. *Xanthocephalus xanthocephalus.* A very common species.

Red-winged Blackbird. *Agelaius phoeniceus* subsp.? This bird together with the Yellow-headed Blackbird and Cowbird was found commonly throughout the district. Sometimes they were in separate flocks but often in great mixed flocks of all three species.

Meadowlark. *Sturnella magna.*

Western Meadowlark. *Sturnella neglecta.* Both the eastern and western forms of this bird were present but I can not say which was the more abundant. Typical songs of each were heard on various occasions.

Baltimore Oriole. *Icterus galbula.* A few Baltimore Orioles were noted every day during my stay but the species was not commonly distributed over the district.

Bronzed Grackle. *Quiscalus quiscula aeneus.* Noted only on August 11. It is probable I overlooked this bird as it should be much more common than my notes indicate.

Goldfinch. *Spinus tristis tristis.* A common species.

Vesper Sparrow. *Pooecetes gramineus gramineus.* Vesper Sparrows were not common at the time of my visit. but a few were noted regularly in a small pasture lying between the two lakes.

Chipping Sparrow. *Spizella passerina passerina.* Noted at Lake Elysian August 13.

Field Sparrow. *Spizella pusilla pusilla.* A number of these birds frequented a brushy pasture near the lake shore about half a mile from the cottage.

Song Sparrow. *Melospiza melodia* subsp.? A very common bird.

Indigo Bunting. *Passerina cyanea.* One male noted on August 11 in the town of Elysian.

Dickcissel. *Spiza americana.* Several were noted on August 13 near Elysian.

Purple Martin. *Progne subis subis.* Two or more pairs had nested near the town of Elysian, and a half dozen or more birds were present throughout my visit.

Barn Swallow. *Hirundo erythrogaster.* A fairly common bird in the mixed flocks of swallows which were present in this district at the time of my visit.

Tree Swallow. *Iridoprocne bicolor.* Noted only on August 11 on Lake Francis.

Bank Swallow. *Riparia riparia.* Noted only on August 11 on Lake Francis.

Rough-winged Swallow. *Stelgidopteryx ruficollis serripennis.* A very common bird in the mixed flocks of swallows found in the district.

Cedar Waxwing. *Bombycilla cedrorum.* Cedar Waxwings were common about the town of Elysian during my entire stay.

Migrant Shrike. *Lanius ludovicianus migrans.* A very common bird along the highways in this district.

Yellow Warbler. *Dendroica aestiva aestiva.* An abundant species found everywhere in the district.

Redstart. *Setophaga ruticilla.* Noted daily about the cottage and grove adjoining, from August 14 to 21.

Catbird. *Dumetella carolinensis.* An abundant species.

Brown Thrasher. *Toxostoma rufum.* Noted every day from August 14 to 24 inclusive.

Western House Wren. *Troglodytes aedon parkmani.* Several pairs of House Wrens had nested near the cottage along the lake front.

Prairie Marsh Wren. *Telmatodytes palustris dissaëptus.* There was a small colony of these wrens in a little cat-tail swamp near one end of Lake Francis.

White-breasted Nuthatch. *Sitta carolinensis.* One or two individuals were seen every day from August 13 to 24 in a timber grove near the cottage.

Chickadee. *Penthestes atricapillus* subsp.? A common species.

Robin. *Turdus migratorius migratorius.* Another very common bird.

Bluebird. *Sialia sialis sialis.* Common in little flocks all over the district.

U. S. Biological Survey,
Washington, D. C.

GENERAL NOTES

Conducted by M. H. Swenk

Starlings Bathing in Ice Water.—At Sandusky, Ohio, Dr. Henry Graefe has a bird bath from which the water overflows into a pool for goldfish. Last winter, when the temperature was below zero, he observed Starlings bathing. The water froze on their wings, making flight so difficult that several of the Starlings were easily caught.—E. L. Moseley, *Bowling Green, Ohio.*

The Pine Siskin Nesting in Southeastern South Dakota.—The writer found a pair of Pine Siskins (*Spinus pinus*) nesting at Yankton, South Dakota, on April 12, 1936. This record seems worthy of publication both because of the rather early nesting date and the fact that the siskin is an uncommon nesting bird in this region. The last nest found by the writer was on May 8, 1930, at Sioux City, Iowa.—Wm. Youngworth, *Sioux City, Iowa.*

Herring Gulls on the Monongahela River During Flood.—On March 18, 1936, at Dravosburg, Pennsylvania, on the Monongahela River, I saw five Herring Gulls (*Larus argentatus smithsonianus*) flying overhead. On the afternoon of the same day at Braddock, Pennsylvania, I noticed four gulls that probably were this species. Gulls rarely occur on this section of the river because of its polluted condition in this vicinity. In my opinion the arrival of the gulls during the flood should be recorded.—P. P. Malley, *New York, N. Y.*

An Early Ohio Record of the Bachman's Sparrow.—In the spring of 1898, in our daily trips to my father's farm in Marshal Township, my brother called my attention to a dark-streaked sparrow's concealed nest with four white eggs. There, not two feet from a much-travelled foot path was my first nest of the Bachman's Sparrow (*Aimophila aestivalis bachmani*). The nest had been hollowed out and shaped in a mat of thick dead grass and was completely concealed by a dense growth of new grass. No opening was visible, the bird slipping in through the loose, dead grass.—Katie M. Roads, *Hillsboro, Ohio.*

An Unusual Nest of the Vesper Sparrow.—On July 2, 1936, my attention was called to a nest on the ground under a raspberry bush in a cleanly cultivated garden. It would have been in plain sight except for one leaf which drooped neatly over. It contained one egg measuring 22x16 mm., nearly white with very indistinct pinkish spots or splotches, and two smaller, gray eggs, 16x11 mm. and 15x12 mm., respectively. The bird was not seen at the time and the identity of such small eggs was a mystery. When I returned on July 4, a Vesper Sparrow was flushed from the nest. I removed one egg and measured the other two, hoping to try trapping the parent after incubation. By this time I had realized that the small eggs must be runt eggs and they proved to be without yolk, as expected. The nest was not visited again for two or three days, when it appeared deserted. After another two days without any evidence of brooding, the entire nest was placed in a covered cardboard box and taken to the office on July 11. Here it was again set aside until July 14, when on opening the box, the large egg had hatched, not earlier than the day before. The nestling was dead. The maximum daily temperatures had been above 100° F., and the building of course quite constantly around 90°. Incidentally, Chapman's Handbook (all editions) gives the length as 1.82 (inches), an evident misprint for .82.—O. A. Stevens, *Fargo, N. Dak.*

The Orange-crowned Warbler at Pittsburgh, Pennsylvania.—On May 7, 1936, at Frick Park in Pittsburgh, I heard an unfamiliar song. It began with a chipping note and in the ending it did not accelerate like the song of the Tennessee Warbler. Its ending was softer and more of a warble-like quality. After a long search I was able to find a bird with a uniform dark olive green back and lighter under parts. The bird kept singing incessantly and while it made a turn around a branch I was able to see the orange crown-patch and identify it as the Orange-crowned Warbler (*Vermivora celata celata*). I heard this bird singing in the same vicinity until May 10, but was not able to see it again. I have been able to find only one published record for this species in this vicinity, and it is of rare occurrence in the state.—P. P. Malley, *New York, N. Y.*

The Cinnamon Teal in Northeastern South Dakota.—While the writer was making the annual duck nesting census in the Waubay Lakes region of northeastern South Dakota, the Cinnamon Teal (*Querquedula cyanoptera*) was added as a new summer resident. The Buffalo Lakes are located in the northern part of the area under observation, and it was on the main lake that a male Cinnamon Teal was seen, feeding in company with an adult male Blue-winged Teal. A thorough search and a long wait failed to disclose the presence of a female Cinnamon Teal. The bird was listed as a lone male, although it is possible that Cinnamon Teals might have nested in this area in the past and that our bird might have been a mated one.—Wm. Youngworth, *Sioux City, Iowa.*

The Old-squaw in West Virginia.—In a mixed flock of ducks observed on Lake Lynn, Monongalia County, West Virginia, on April 28, 1936, was a male Old-squaw (*Clangula hyemalis*). It was discovered near the Ice's Ferry bridge in the morning, and spent the day in that vicinity, several observers having had a chance to study it closely. In plumage it was somewhat intermediate between typical summer and winter phases, but the large amount of white and brown coloration, together with the stout black and pinkish bill, made identification easy. There are very few West Virginia records for this species. Bibbee has taken specimens on the Ohio River, and A. S. Morgan has noted a few individuals along the Great Kanawha River. So far as we know, the species has not been noted during recent years in northern West Virginia.—Maurice Brooks, A. S. Margolin, and Lloyd Poland, *Morgantown, W. Va.*

The Arctic Horned Owl in South Dakota.—The Arctic Horned Owl (*Bubo virginianus subarcticus*) is classed as a "winter straggler" in South Dakota, where it ranges mostly over the northern half of the state. It likely occurs here more commonly during severe winters, attended by lack of food farther north. There are three specimens in the Museum; one taken in Sanborn County, winter of 1900; one from Plymouth County, Iowa, winter of 1915, and one taken in Spink County, South Dakota, March, 1936. The latter specimen had recently partaken of a white domestic chicken and a rat. This owl is about the size of the common Great Horned Owl and is probably often mistaken for it, but is distinctly grayer. Especially is this noticeable in the facial disks.—W. H. Over, *University Museum, Vermillion, S. Dak.*

The Subspecies of Red-winged Blackbirds Wintering Near Toledo, Ohio.—During the past eight years flocks of from twenty to 300 Red-winged Blackbirds have been found wintering about Toledo, in the marshes of Jerusalem Township, Lucas County, Ohio, and Erie Township, Monroe County, Michigan.

In an effort to determine the composition of these flocks of wintering birds, twenty-three specimens were collected during 1934, 1935, and 1936, between the dates of December 27 and February 29. Twenty-one of these proved referable to *Agelaius phoeniceus arctolegus*. The other two are first winter males which have not been determined because of a lack of comparative material. Twenty-one of the specimens were preserved as skins, fifteen being now in the Museum of Zoology of the University of Michigan, three in the Ohio State Museum and three in the collection of O. E. Ehrhart, at Antwerp, Ohio. The earliest spring specimen of *Agelaius phoeniceus phoeniceus* was taken on March 12, 1933. The evidence thus indicates that the common wintering Red-winged Blackbird of the Toledo region is *Agelaius p. arctolegus*, the breeding form, *Agelaius p. phoeniceus*, not arriving from the south until the second week in March.—Louis W. Campbell, *Toledo, Ohio.*

Pugnacious Cardinals.—Within less than a year six adult male Cardinals have been found dead in the yard, less than one acre in extent, of Dr. Henry Graefe, at Sandusky, Ohio. The killing was not in any case directly observed, but Dr. Graefe has witnessed many desperate combats between rival males and has found no other cause of death on an examination of the dead bodies. One frozen carcass had feathers missing from the neck. When the skin was removed, the neck appeared to have been broken. Last winter he saw a mature Cardinal come up to his male offspring from behind, pounce on his back and take out a quantity of feathers. A few days later the injured bird was found dead.

The female Cardinal which is living in the yard now has had three mates within a year. Her present mate was not in mature plumage when first observed, which was late in the winter. He has been most attentive to his bride, and has induced her to share with him roasted peanuts which he has cracked. Her earlier mates would not eat peanuts, nor did she until she received them from her present spouse.

Recently Dr. Graefe saw the father bird chase his son away from the feeding tray, and then return and feed his mate with sunflower seeds. Both parents fed their two young for some time, and the father was seen to feed his daughter after he had chased her brother away.—E. L. Moseley, *Bowling Green, Ohio.*

Observations of the Sandhill Crane on the Queen Charlotte Islands, British Columbia.—While at Massett on May 17, 1935, I watched for over an hour eighteen Sandhill Cranes (*Grus canadensis tabida*) feeding over a wide meadow surrounded on three sides by forest. They kept well out from the trees and were possibly 150 yards from where I stood at the forest edge. In an irregular line the birds paced slowly along with a somewhat swinging stride, with necks bent forward and heads held close to the ground as they thrust their bills into the grass clumps or swung from side to side to pick at small objects on the ground. They were entirely silent. Most of the birds were richly colored on the back, almost copper in some lights and in contrast were several with considerably less brown, appearing almost completely grey in certain positions.

Finally I started to walk slowly toward them, and feeding immediately stopped. All stood upright, in which position their large size was more readily apparent. One bird extended both wings straight out from the shoulder and drooping from the carpal angle. In this attitude and facing another bird it sprang into the air several times at which the bird opposite did likewise. Two

other birds in another part of the line gave a similar performance. Shortly after this all the birds rose and flew to another part of the meadow. I was then about 100 yards from them. During all this time fifty White-cheeked Geese (*Branta canadensis occidentalis*) grazed seventy-five yards or so from the cranes and these did not take flight. Fifteen minutes later the cranes circled twice over the portion of the meadow where they had been feeding, several giving the characteristic call, then rising higher in the air continued their flight over the forest. Ten days later the cranes, this time numbering twenty-two, were again observed on the same meadow. A resident in Massett told me that this flock had been in the vicinity since March. No cranes were seen near Massett during the spring of 1920 when I spent six weeks there.

The identification of the birds as the Sandhill Crane, rather than the Little Brown Crane, is based on their large size and the fact that they remained in the region for such a long period. The reason why Sandhill Cranes in this instance should be associated in a flock so late in the season is not understood.—J. A. Munro, *Okanagan Landing, B. C.*

The Cautious Female Cardinal.—With all her protective coloring the female Cardinal is more cautious, or at least more trap shy, than the male, according to my records. A flock of thirteen Cardinals has often been in sight at once, feeding at my station, since November, 1935. Of this flock seven are males and six are females. Six of the males have been banded this winter, while not a female, to my knowledge, has been within three feet of the traps.

At Steelville, Missouri, from 1931 to 1936, twenty-eight Cardinals have been banded, twenty-two males and six females. The six females were caught during the spring nesting season. Records for Monett, Missouri, from 1928 to 1930, show seventeen caught, nine males and eight females. Four of the females were caught during the nesting season.

Records by months are shown in the following table:

Month	Male	Female
January	5	2
February	6	1
March	4	4
April	7	3
May	1	3
June	1	0
September	1	0
October	3	0
November	0	1
December	3	0
Total	31	14

—Cora Shoop, *Steelville, Mo.*

Nesting of the Mexican Black Hawk in Arizona.—On April 21, 1936, the writer found a nest of the Mexican Black Hawk (*Urubitinga anthracina anthracina*) in lower Arivaipa Canyon, Arizona, about one mile above the ranch of Joe A. Buzan. The nest was a large, bulky affair placed in the crotch of a tall cottonwood about sixty feet from the ground. The bird was seen as it flew off the nest. It went to a rock about 300 feet distant and from there would occasionally berate the observer with a petulant screech or cry. It was inferred that the bird was a female. No companion bird was noted. No attempt was made to

climb the tree, since it was of large girth and branchless to thirty feet above the ground, and no climbing implements were available, so it is not known whether the nest was empty, or contained eggs or young.

The Arivaipa is an eastern tributary of the San Pedro River, which in turn flows into the Gila. The lower Arivaipa is in the northeastern corner of Pinal County, Arizona, and in a comparatively remote and isolated area. Among the other birds seen on the same date and in the same place were: Treganza's Heron (*Ardea herodias treganzai*), Western Solitary Sandpiper (*Tringa solitaria cinnamomea*), Western White-winged Dove (*Melopelia asiatica mearnsi*), Inca Dove (*Scardafella inca inca*), Western Belted Kingfisher (*Megaceryle alcyon caurina*), Cassin's Kingbird (*Tyrannus vociferans*), Vermilion Flycatcher (*Pyrocephalus rubinus mexicanus*), Bridled Titmouse (*Baeolophus wollweberi annexus*), Arizona Verdin (*Auriparus flaviceps flaviceps*), Townsend's Solitaire (*Myadestes townsendi*), Lucy's Warbler (*Vermivora luciae*), Arizona Hooded Oriole (*Icterus cucullatus nelsoni*), Arizona Pyrrhuloxia (*Pyrrhuloxia sinuata sinuata*), and Green-backed Goldfinch (*Spinus psaltria hesperophilus.*)

Since breeding records, to say nothing of sight records, of the Mexican Black Hawk are so few, it is thought that the above item may be of interest.—Gale Monson, *Soil Conservation Service, Safford, Ariz.*

American Pintail Exhibits Feigning Behavior.—On July 17, 1935, while driving along the road grade which separates a small marsh from the northwest end of Heron Lake, in Minnesota, I stopped to watch some American Bitterns (*Botaurus lentiginosus*) and Black-crowned Night Herons (*Nycticorax nycticorax hoactli*) feeding. Suddenly I became aware of an American Pintail (*Dafila acuta tzitzihoa*) in the road about twenty feet in front of the car. It made a great commotion flopping around in the road, and my first thought was that it was injured. I had watched it for a full minute when a car approached from in front of me. The car was twenty yards away with the pintail directly in its path, when I realized that it would surely be run over. It was now too late for me to do anything about it as the car was close and moving quite rapidly. To my surprise and relief, the bird took wing easily and gracefully, made a half circle about ten feet from the ground and lit in the weeds to the left of the road. I had hardly recovered from my surprise when out of the weeds on the right marched six young pintails about half grown. They paid no attention to me whatever, but peeping at the top of their voices, waddled across the road ten feet in front of me and disappeared in the tall weeds where their mother kept up a continued quacking. A few moments later I saw the hen followed by her brood emerge into the open pasture thirty yards beyond and waddle down to the marsh, all complaining bitterly. This pantomime is common to a great many birds, but this is the first time I ever knew of it being performed by a duck, and I was completely "taken in".—Bruce F. Stiles, *Sioux City, Iowa.*

Supplementary Bird Records from Missouri, for 1934.—During the summer of 1934 some observations were made of the bird fauna of the lowland counties of southeastern Missouri. Some species and subspecies whose status in Missouri was in doubt, but which were recorded in Bennitt's "Check-list of the Birds of Missouri" (*Univ. Mo. Studies*, VII, No. 3, 1933), were collected. The specimens the names of which are starred (*) were kindly identified by Dr.

Harry C. Oberholser of the United States Biological Survey. All the specimens secured are now in the collection of the University of Missouri.

*Southern Downy Woodpecker (*Dryobates pubescens pubescens*). First Missouri record. Previously reported from points close to Missouri, in Kentucky, Tennessee, and Arkansas. There are four specimens from Dunklin County: two females (Cardwell, June 13; Campbell, June 20) and two males (Campbell, June 27).

*Southern Crow (*Corvus brachyrhynchos paulus*). First Missouri record. Previously reported in western Tennessee. A female was taken at Puxico, June 24, and two males at Campbell, June 20 and 27.

*Southern Robin (*Turdus migratorius achrusterus*). First Missouri record. Previously reported from points close to Missouri, in Illinois, Tennessee, Arkansas, and Kansas. Two males were taken (White Oak, June 20; Campbell, June 27), and two females (Kennett, June 21 and June 27).

*Maryland Yellow-throat (*Geothlypis trichas trichas*). First Missouri record. The A. O. U. Check-List of 1931 (p. 296) does not list this form as occurring in Missouri, but Bennitt includes it in his hypothetical list (p. 56). Two males were taken at Cardwell, June 15 and July 5.

*Florida Blue Jay (*Cyanocitta cristata florincola*). First reported from southeastern Missouri in Bennitt's Check-List (p. 45) on the basis of three specimens. Six more were collected in Dunklin County in June, 1934, establishing this as the summer-resident race in that region.

*White-breasted Nuthatch (*Sitta carolinensis carolinensis*). Three specimens were taken in Dunklin County during June and July, 1934. A specimen of the Florida race, *S. c. atkinsi*, collected in Howell County is now in the National Museum collection. Oberholser has referred two specimens from central Missouri to this subspecies (Bennitt, 1933, p. 46). It appears that both subspecies occur in southern Missouri.

*Migrant Shrike (*Lanius ludovicianus migrans*). Eight specimens were taken in Dunklin County in June, 1934. The Loggerhead Shrike (*L. l. ludovicianus*) has been recorded at points near Missouri in southern Illinois, Kentucky, and Tennessee, but *migrans* appears to be the summer resident shrike of southeastern Missouri.

*Western Parula Warbler (*Compsothlypis americana ramalinae*). Specimens of the Parula Warbler had not been collected from southeastern Missouri. Typical specimens of the northern subspecies have been taken elsewhere in Missouri. The western subspecies is not now recognized by the A. O. U. Committee, but it is interesting to note that the four birds taken in Dunklin County in June and July, 1934, were all referred by Oberholser to *ramalinae*.

*Southern Meadowlark (*Sturnella magna argutula*). Five males were taken in June, 1934, establishing this as the summer resident meadowlark of southeastern Missouri. The only previously recorded specimen from there was one taken by Howell in New Madrid County in 1910.

Painted Bunting (*Passerina ciris*). Reported from southern and western Missouri by Bennitt (1933, p. 60). A male in full plumage was observed at close range July 4, 1934, near White Oak, Dunklin County. This extends the known range for this species in Missouri.—James W. Cunningham, *Dept. Zoology, Univ. Mo., Columbia, Mo.*

EDITORIAL

THE TWENTY-SECOND MEETING of the Wilson Ornithological Club was held at the Chicago Academy of Sciences on November 27 and 28. A full report of this meeting will be given as usual in the March number.

THE RECENT MEETING at Pittsburgh of the American Ornithologists' Union afforded a splendid program of ornithological papers, and brought together a large number of the well known ornithologists of the country. This meeting was honored by the presence of M. Jean Theodore Delacour, of France. Perhaps the most important event of the meeting was the announcement of the retirement of Dr. Witmer Stone as Editor of the *Auk*, after a term of twenty-five years of distinguished service. It was announced at the same time that Dr. Glover M. Allen, of Boston, would assume the editorial duties with the beginning of the 1937 volume.

AT THE RECENT October meeting of the National Association of Audubon Societies Mr. John H. Baker, Executive Director, announced that the Association is establishing a number of Fellowships in educational institutions which are willing to coöperate. These Audubon Fellowships will afford an annual stipend of about $1500 to cover the investigator's living and traveling expenses. It is expected that the institution will contribute a like amount in services and equipment. The ecological problems to be studied under these fellowships will not be limited to "game" animals, nor will they be selected on the basis of economic considerations. We understand that the purpose is to encourage unbiased biological research on problems of predator control, ecological effects of introduced exotic species, mosquito control, use of poisons, the rôle of fish-eating birds near hatcheries, the status of numerous disappearing species, etc., etc. We believe that this is one of the most noteworthy of the recent steps taken in furthering the cause of wild life. It will be most interesting to watch the development of this plan.

ORNITHOLOGICAL LITERATURE

THE AMERICAN WOODCOCK. By Olin Sewall Pettingill, Jr. Vol. 9, No. 2, Memoirs Boston Soc. Nat. Hist. Boston (234 Berkeley St.), 1936. Pp. 168-391, Pls. 13-21. Price, $3.50, paper.

Dr. Pettingill's conclusion of his work on the Woodcock now adds a most important monograph to our ornithological literature. One of the directions of progress now open in general is the collection of scattered facts and their compilation into monographs of single species, with such factual contribution as the author may be prepared to make. Being a monograph this paper discusses every aspect of the species, so far as we can judge.

There have been a number of debated points concerning certain habits of the Woodcock. In the past some have thought that the call note of the Woodcock has been made by the voice apparatus; while others have claimed that it is made mechanically by the wing or other structures. Pettingill concludes that sounds are made in both ways. The author discounts the claim that the Woodcock carries the young away in the event of danger. The peculiar anatomy of the Woodcock bill, which adapts it as a probing and prehensile organ, is described. The structure, distribution, breeding habits, and ecological relations are fully considered. An extensive bibliography is given. Ten plates of photographs and a colored frontispiece are the illustrations. Only one thousand copies of this work were printed, which, we trust, will be sufficient to meet all demands.—T.C.S.

THE NORTHERN BOB-WHITE'S WINTER TERRITORY. By Paul L. Errington and F. N. Hamerstrom, Jr. Research Bull. No. 201, Ia. Agric. Exp. Sta. and Ia. State Coll. Pp. 301-443. Ames, Iowa, 1936.

While this report deals primarily with the problems of game management, yet it is based on a native species and contains a considerable amount of life history material. The report is based upon studies in Wisconsin and Iowa, and is limited to the winter season, which is the critical season for this species in the northern part of its range.

Part I of the bulletin deals chiefly with field methods. It has been shown that a given Bob-white cover has a fixed "carrying capacity", meaning that any given area will support a definitely limited number of birds, and any number over this becomes an excess population subject to predation and starvation. The carrying capacity must be determined by the census method. One of the important contributions in this paper is the discussion of census technique on winter Bob-white populations. In the main there are two census methods, one called the "'track count", the other called the "'flush count". Of these the authors find the method of counting the number in a covey by tracks in the snow to be the most serviceable and reliable. In all methods of census-taking much skill may be developed; in fact it seems to require the highest type of woodscraft and detective skill. This discussion is instructive and entertaining.

Part II is a lengthy presentation of fundamental data. Part III is entitled "Analysis of Carrying Capacity", while Part IV deals with management. The conception of carrying capacity is a truly important one. And there probably is a limited carrying capacity for every kind of living thing on the earth—not alone for game birds. It is embodied in the idea of the struggle for existence. In the older biological phraseology the individuals in an excess population are presented

with the alternatives of surviving, perishing, or emigrating. The present day study of game birds is prone to leave out of consideration the latter alternative. And the practical argument is that if these excess populations are to die anyway (because the land carrying capacity will not support them) they may as well be utilized for sport. Of course, if the Bob-white population on a given tract is kept down to the land carrying capacity by shooting the excess, there will be no necessity for emigration, and there will probably be little, if any. This program is all right for the particular tract, but makes no provision for increasing the population beyond that tract.

In this study attention is focused on the Bob-white as a game bird, even though it may be an impartial study from that point of view. The study of the winter life of the Bob-white is probably not the place to expatiate on the many virtues of this bird. But the point is that this report will be used as justification for at least controlled shooting of the Bob-white. Reverting, it seems to us that any program for the management and controlled hunting of the Bob-white should make ample provision for areas on which these birds may propagate beyond the carrying capacity of the land, thus making range extension possible. In this way the larger area, such as county or state, may derive some benefit from the state-supported game management program.

There is another angle to the game management program. Many of the plants which furnish a splendid food supply for the Bob-white also furnish allergens (in the form of wind-borne pollen) to be wafted hither and yon for miles, to the great suffering of allergic patients. Such plants, for instance, as the ragweeds (*Ambrosia*), hemp (*Canabis*), and lamb's quarters (*Chenopodium*), are among the numerous causes of hay fever, asthma, and other allergic diseases of the human body. Many sufferers from these allergies will prefer to have such plants eradicated, rather than encouraged for the immediate benefit of Bob-white or ultimate pleasure of the hunter. This line of thought only emphasizes the web of life, because it may be pointed out that sick people make a living for the doctors and raising food for the Bob-white adds to the income of the farmers.—T. C. S.

Ethics of Egg-Collecting. By Eric Parker. Published by The Field, London, E. C. 4. Not dated, but "Foreword" dated April 30, 1935. Pp. 1-20+i-vi. Price, 5/-net.

This book has been sent to us by an American with the request that it be reviewed. We do not know how much of a problem egg-collecting may be in this country. We had supposed that it had been brought under sufficient control. We had merely taken it for granted that the craze for egg-collecting by the school boys in the 80's and 90's had been eliminated by the process of education. The widespread prevalence of this hobby was, in those years, doubltess more or less of a menace even to the common species. But, nowadays it is probable that the danger, if any, lies in the collection of the eggs of rare species. This danger is probably greatly increased by an existing market. It may become necessary to prohibit the importation and commerce in the eggs of wild birds, as is now done in some countries for feathers.

However, reverting to the book under discussion we find that it is a record of a local controversy, rather than a presentation of the general problem. The sportsmen's magazine which sponsored the controversy may be suspected of being motivated by the complaints of a wealthy clientage against the trespassing

nuisance of egg collectors. So, to the outsider, there seems to be some of the spirit of the "pot which calls the kettle black". The "keepers [of the private estates] were on the lookout for all trespassing egg-collectors", who were seeking the eggs of "green-shanks, crested tits, and dotterels". But the same keepers were accused of shooting all the "hobbies" and other hawks, because of their supposed depredations on the game of the premises.

Nevertheless, the letters brought out evidence of the audacity of certain egg-collectors. It was reported that a certain collector visited the coastal cliffs in search of "erythristic" guillemot eggs. Finding none he swept all the existing eggs into the sea in order to induce the birds to lay again, with the possibility of obtaining the desired variation.

An interesting question raised during the debate was whether "it is more of a crime to take eggs from a peregrine nest than to take the young birds for falconry purposes". The egg protectors devised the scheme of marking eggs with an indelible pencil to make them worthless to collectors. It was intimated that in reprisal the collectors would pin-prick such marked peregrine eggs to prevent their development for the benefit of the falconers. Several persons even defended egg-collecting as a field sport pure and simple.

On the other hand, a good deal of emotionalism and false reasoning was indulged in by both sides. At the conclusion of the discussion one can hardly decide that a clear-cut verdict has been reached, at least on the basis of the arguments. However, it is clear that the egg-collectors are in the minority, and are likely to lose all privileges when it becomes evident that they are exceeding the bounds of propriety. The problem will be vastly simplified with the elimination of commercialism.—T. C. S.

Vanished Hosts. By E. D. Nauman. The Palimpsest, XVI, No. 6, June, 1935. Pp. 169-173.

In this article the late Mr. Nauman says: "The rule with wild pigeons was to lay only two eggs at a nesting, but to nest three or four times a year." In another place he says: "They would form in great 'windrows' of pigeons across the sky from horizon to horizon sometimes in lines not so long, but always at right angles with the direction in which they were flying. Between these windrows of pigeons a strip of sky could usually be seen. The flocks were frequently so dense they obscured the sun like passing clouds. When the weather was calm, the pigeons maintained a very nearly level and uniform elevation throughout their lines, but in windy weather the lines would twist and writhe like huge serpents in the sky. At such times one could best see their remarkable colors scintillating in the sunshine." This description is of the birds as migrants in southeastern Iowa, Keokuk County. No nesting colony in Iowa was known to Mr. Nauman. With this article there is a reproduction of Sawyer's painting of the Passenger Pigeon. So far as we have traced this portrait it appeared first in the April-June number of the *Iowa Conservation* for 1923 (VII, No. 2); next in *Wildways* for April-June, 1928 (VIII, No. 2); next in *Iowa Bird Life* for December, 1933 (III, No. 4); then in the magazine article here reviewed. This Sawyer portrait was probably not produced until after the publication of the list of Passenger Pigeon portraits (Sci. Month., May, 1921), at any rate it is not included.—T. C. S.

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nuisance of egg collectors. So, to the outsider, there seems to be some of the spirit of the "pot which calls the kettle black". The "'keepers [of the private estates] were on the lookout for all trespassing egg-collectors", who were seeking the eggs of "green-shanks, crested tits, and dotterels". But the same keepers were accused of shooting all the "hobbies" and other hawks, because of their supposed depredations on the game of the premises.

Nevertheless, the letters brought out evidence of the audacity of certain egg-collectors. It was reported that a certain collector visited the coastal cliffs in search of "'erythristic" guillemot eggs. Finding none he swept all the existing eggs into the sea in order to induce the birds to lay again, with the possibility of obtaining the desired variation.

An interesting question raised during the debate was whether "it is more of a crime to take eggs from a peregrine nest than to take the young birds for falconry purposes". The egg protectors devised the scheme of marking eggs with an indelible pencil to make them worthless to collectors. It was intimated that in reprisal the collectors would pin-prick such marked peregrine eggs to prevent their development for the benefit of the falconers. Several persons even defended egg-collecting as a field sport pure and simple.

On the other hand, a good deal of emotionalism and false reasoning was indulged in by both sides. At the conclusion of the discussion one can hardly decide that a clear-cut verdict has been reached, at least on the basis of the arguments. However, it is clear that the egg-collectors are in the minority, and are likely to lose all privileges when it becomes evident that they are exceeding the bounds of propriety. The problem will be vastly simplified with the elimination of commercialism.—T. C. S.

Vanished Hosts. By E. D. Nauman. The Palimpsest, XVI, No. 6, June, 1935. Pp. 169-173.

In this article the late Mr. Nauman says: "'The rule with wild pigeons was to lay only two eggs at a nesting, but to nest three or four times a year." In another place he says: "They would form in great 'windrows' of pigeons across the sky from horizon to horizon sometimes in lines not so long, but always at right angles with the direction in which they were flying. Between these windrows of pigeons a strip of sky could usually be seen. The flocks were frequently so dense they obscured the sun like passing clouds. When the weather was calm, the pigeons maintained a very nearly level and uniform elevation throughout their lines, but in windy weather the lines would twist and writhe like huge serpents in the sky. At such times one could best see their remarkable colors scintillating in the sunshine." This description is of the birds as migrants in southeastern Iowa, Keokuk County. No nesting colony in Iowa was known to Mr. Nauman. With this article there is a reproduction of Sawyer's painting of the Passenger Pigeon. So far as we have traced this portrait it appeared first in the April-June number of the *Iowa Conservation* for 1923 (VII, No. 2); next in *Wildways* for April-June, 1928 (VIII, No. 2); next in *Iowa Bird Life* for December, 1933 (III, No. 4); then in the magazine article here reviewed. This Sawyer portrait was probably not produced until after the publication of the list of Passenger Pigeon portraits (Sci. Month., May, 1921), at any rate it is not included.—T. C. S.

Studies on the Bank Swallow Riparia riparia riparia (Linnaeus) in the Oneida Lake Region. By Dayton Stoner. Roosevelt Wild Life Annals, Vol. 4, No. 2, May, 1936. Pp. 126-233.

Some of the New York habitats of the Bank Swallow, as shown in the photographs, could easily be mistaken for the eroded banks of the Missouri River or numerous cut-off lakes, where the same species breeds in great numbers. In the study of weight some comparisons are made of the same bird on different dates; and between individuals of the same species in New York and Iowa. An extensive study of body temperature was made, and it is reported that the average temperature of 603 Bank Swallows was 107.1° F. The temperature of the burrow in which young were reared was found to vary from 51° F. to 87° F., and seemed to vary with the temperature of the outside air, depth of burrow, etc. The digging of the nest hole, nest building, egg and egg-laying, behavior of young birds, food and feeding of adults and young, are among the topics discussed. The subject of predators and parasites is also discussed. The paper contains a large amount of original data.—T. C. S.

The Audubon Yearbook, 1936. Published by the Indiana Audubon Society. Vol. IX, pp. 1-56. Price $1.00 (Mr. Harold Zimmerman, 915 W. Gilbert St., Muncie).

This Yearbook is dedicated to George S. Clifford, whose biography is written by Dr. A. W. Butler. In addition this number contains several other sketches of other Indiana bird lovers, namely, Mrs. Etta S. Wilson, Miss Mary Louise Carmichael, and Mr. E. B. Williamson, noted authority on dragon-flies. Dr. Butler also gives a review of the Black Vulture records in Indiana. By far the most arresting fact in the booklet is the brief mention of the death of a lad in Indianapolis who, in befriending a bird, was pushed into a river by a bully. This is a new phase of the conservation problem, and we would like very much to know what the public authorities do under the circumstances. We understand that the Indiana Audubon Society raised a small fund and is planning some sort of a memorial. Something of a permanent and public nature might help to convert many a boy to the finer opportunities of life. There might be a possibility of interest outside of Indiana in a matter of this kind.—T. C. S.

Food Habits of Common Hawks. By W. L. McAtee. Circ. 370, U. S. Dept. Agric. 1935. Pp. 1-36. Price, 5 cents.

Consisting of an introduction with general remarks on the habits of hawks in general, and a body of specific discussions of range, recognition marks, and food habits.—T. C. S.

The Crested Mynah, or Chinese Starling, in the Pacific Northwest. By Theo. H. Scheffer and Clarence Cottam. Tech. Bull. 467, U. S. Dept. Agric. 1935. Pp. 1-27. Price, 5 cents.

The report given herein is a most interesting one, concerning the appeaarnce of a new and picturesque bird in the Pacific Coast avifauna. This Chinese Starling is said to be as offensive toward native birds as the European Starling is on the eastern part of the continent. Thirty-five titles are listed in the bibliography, and most of these relate to the Chinese Starling on the West Coast.—T. C. S.

More Songs of Wild Birds. By Albert R. Brand. Published by Thomas Nelson & Sons, 381 Fourth Ave., New York, N. Y. 1936. Pp. 1-116. 3 records. Price, $2.50.

We have here a second instalment of the previous "Songs of Wild Birds", published in 1934. (For review of the latter see Wilson Bulletin for June, 1934, p. 129). The present book consists of four features, viz.: Two chapters of general discussion of bird song, covering nearly half of the pages of the book; detailed information about each of the birds whose songs are given on the records, about a page to each species, making up the other half of the book; an index; and three double-faced phonograph records, which are carried in the pocket on the inside cover. Of course, it is the records which furnish the *raison d'etre* of the book. On the six faces of these records there are recorded the songs of forty-three American birds. The two preceding records contained thirty-five songs.

We wish that we might give these records our unstinted praise. Their great novelty and the inventiveness and skill back of them make them unique and interesting in the extreme. A number of songs come out clear and loud, notably the Pileated Woodpecker and the Chuck-will's-widow. Some others are scarcely audible in the ordinary home phonograph. So, it may be that our criticism should be directed at the amplifying mechanism of the reproducing phonograph, rather than at the records. On the whole they are good, and could furnish several evenings with program and discussion.—T. C. S.

October Farm. By William Brewster. Edited by Smith O. Dexter. 1936. Pp. i-xv+1-285. Harvard University Press, Cambridge, Mass. Price, $2 50.

The book is composed of extracts from Brewster's diary, the first one being dated 1872, the last one, 1919. The diary is full of Mr. Brewster's field notes, mostly on birds, but frequently on reptiles and mammals. In simple language he tells of his observations and experiences in the fields and woods. On page 6 we find a note entitled "Snake Charms Thrush", and Mr. Brewster writes that "the Thrush was beyond question in a fascinated and semi-unconscious condition". It would thus seem that Mr. Brewster accepted to some extent the notion that birds may come under the hypnotic influence of snakes, although in the next sentence he disclaims any belief that the snake was knowingly exercising such an influence. In another place (page 129) a description is given of the egg-laying of a "painted tortoise", which is doubtless one of the common "mud" turtles. The eggs were deposited one at a time and covered with dirt which was tightly packed down. A careful description is given of the turtle covering the spot with dry leaves and bits of grass, but no mention is made of urination on the spot by the mother turtle. Crows (page 194) and Bluejays (page 163) are reported as nest robbers. It is the diary of one of America's well known ornithologists. Brewster's farm, near which most of the observations were probably made, was called "October Farm": hence the editor chose this as the title for the book.—T. C. S.

Birds. By Gayle E. Pickwell. Science Guide for Elementary Schools. I, No. 9, April, 1935. Calif. State Dept. Educ., Sacramento. Pp. 1-51. Price, 15 cents.

A pamphlet on the structure and behavior of birds, for the schools of California. Much information suitable for class teaching is presented in available form. It is freely illustrated.—T. C. S.

1. A Last Plea for Waterfowl. By Irving Brant. (January, 1934).
2. The Wild Ducks' Waterloo. By William T. Hornaday. (September, 1934).
3. Save the Bald Eagle. Anonymous. (January, 1935).
4. The White Pelicans of Great Salt Lake. By Rosalie Edge. (May, 1935).
5. The Collapse of Waterfowl Protection. By Irving Brant. (June, 1935).
6. The Future of Waterfowl Protection. By Irving Brant.
7. The Waterfowl Are Yours. By Rosalie Edge. (January, 1936).
8. "Framing" the Birds of Prey. By Davis Quinn. Revised Edition. Pub. No. 55. (April, 1936).
9. The Migratory Bird Treaty with Mexico. By Rosalie Edge. Pub. No. 56. (May, 1936).

All of the papers listed above have been published by the Emergency Conservation Committee as separate bulletins. We have selected for mention only those which deal with birds. Many other pamphlets have been issued which relate to mammals, to parks, or to general conservation problems. The serial numbers suggest that fifty-six such pamphlets have been issued by this organization since it began work about seven years ago. These bulletins may be obtained free or for about ten cents apiece from the Emergency Conservation Committee (734 Lexington Ave., New York, N. Y.). One of the early pamphlets was called "'Framing' the Birds of Prey". Recently a new and revised edition has been issued and widely distributed. It includes a brief account of the enterprise at Hawk Mountain and a short discussion of the evil of the pole trap. Some doubt has been expressed as to the identity of one of the illustrations, but even if an error has been made on this point it can not lessen the general effectiveness of this literature. It must be remembered that these publications are not presented as scientific literature, but as propaganda directed toward the salvation of wild life. It has not been shown, we believe, that this literature has deviated in any consequential way from scientific truth. On the other hand, the good it has done in public education on the matters of wild life protection, conservation of forests, parks, etc., would be beyond simple calculation. The quantity of these publications distributed to the public must have been very large. The language used has been straight forward, and from the shoulder, as is expected in debate. The fight has been waged in behalf of wild life and inanimate nature; and it is of little consequence that human toes have been stepped on, or official feelings hurt.—T. C. S.

Observations on the November Birds of Western Kansas. By W. S. Long. Univ. Kans. Sci. Bull., XXII, No. 12, 1935.

This paper is an effort to throw some light on the shifting fall birds in western Kansas. Sixty-nine species of birds are reported upon, for most of which specimens were collected.—T. C. S.

Bulletin of the Essex County Ornithological Club of Massachusetts. Peabody Museum, Salem, 1935. Pp. 1-63. Price, 25 cents.

This number contains: critical remarks by Mr. Ludlow Griscom on the Hairy Woodpeckers in New England. A record of an Ivory Gull in Essex County, by Mr. Ralph Lawson. An interesting discussion of the pros and cons of a sight record of Glossy Ibises in New England. An Easterner's account of birds seen on a western trip, by Mr. Campbell Bosson. And short notes.—T. C. S.

1. The Shortage of Waterfowl (Unit No. 1). March, 1934. 10 cents.
3. Eagles (Unit No. 3). February, 1935. 10 cents.
4. Fish-Eating Birds (Unit No. 4). May, 1935. 10 cents.

These "teaching units" have been prepared by Ellsworth D. Lumley and published by the Emergency Conservation Committee (734 Lexington Ave., New York). They are practical guides for the school study of the forms of wild life covered. In the waterfowl unit the author states that "the word 'predator' has been substituted for the too frequently used 'vermin', an introduced misnomer of the ignorant English game-keeper." It will be well for this word to go out of use altogether with its present connotation. These pamphlets present certain pertinent information together with devices by which the pupil can reorganize the material. Each unit offers a varying number of "projects" so that different members of a class may work along different lines. They seem to be feasible from an educational point of view, and helpful to conservation at the same time.—T.C.S.

Some Notes on the 1935 Season, Especially on the Raptorial Birds of the Northwest. By Warren F. Eaton. Circular No. 24, National Association of Audubon Societies. December, 1935.

A collection of facts and observations concerning the status of hawks in various parts of the country during 1935.—T. C. S.

A Life History Study of the California Quail, with Recommendations for Conservation and Management. By E. Lowell Sumner, Jr. Calif. Fish and Game, July and Oct., 1935, pp. 165-256, 277-342. (Reprint, Sacramento, 1936).

In character and extent this paper compares favorably with Errington's work on the Eastern Bob-white, reviewed elsewhere in this issue. About half of the pages are devoted to "life-history", while Part II may be said to deal with management. The author speaks of the "law of edges", by which he means that the birds tend to spend a large part of their time along the margins between food and cover. Therefore an optimum area of "edge" habitat will support more birds, provided the right amount of food is available. The water requirements of these birds is discussed. A monthly study throughout the year of the ratio between sexes showed that the males were always slightly in excess of the females, the fluctuation never exceeding four per cent. Practically the same ratio held throughout the year, indicating that both sexes are subject to the same mortality rate. It has usually been thought that an excess of the male sex exists to compensate for a higher mortality rate. If this higher mortality rate of males does not exist, some other explanation must be found for their uniformly greater numbers. The paper is accompanied by an ample bibliography, but there is no index.—T. C. S.

The *Prothonotary* for May, 1936 (II, No. 5), gives the usual list of noteworthy records. The Buffalo Ornithological Society makes occasional over-night trips to points of ornithological interest, such as a trip to the Pymatuning Swamp, in Pennsylvania. In the June number a poor flight of warblers is reported, which agrees exactly with the report from West Virginia in the *Redstart*. The August number (II, No. 8) contains a criticism of the "Migratory Bird Treaty with Mexico".

The *Nebraska Bird Review* for July, 1935 (III, No. 3) has an article by Mrs. George W. Trine on the Purple Martin which will be of interest to those who have martin houses. An exceptionally large amount of migration data, covering twenty-seven pages, makes up the bulk of the issue. Prof. Swenk continues his history of Nebraska ornithology, dealing in this instalment with the Lewis and Clark Expedition. A selection of general notes and minutes of the 1935 annual meeting complete a very sizable number. The October number (III, No. 4) contains a paper by Messrs. Swenk and DuMont on the weights of Canada Geese, giving the weights of 356 of these birds. Regardless of subspecies these weights ranged from three to thirteen pounds. The April number (1936, IV, No. 2) contains Prof. Swenk's important paper on the distribution and hybridization of the Rose-breasted Grosbeak and the Black-headed Grosbeak. A number of cases of evident hybridism are recorded. Two maps help much to visualize the distribution of the two species and clarify a great amount of data. Short notes in the July number (IV, No. 3) report the presence of Palmer's Curve-billed Thrasher and the Woodcock in different localities of Nebraska.

From the January number of the *Raven* (VII, No. 1) we learn that a September Song Sparrow taken in southwest Virginia is *Melospiza melodia beata*. And also that the Southern Robin (*Turdus m. achrusterus*) is apparently the breeding form throughout the state: while the Eastern Robin (*T. m. migratorius*) occurs in winter. The number for April (VII, No. 4) includes a biographical sketch of Mark Catesby by Dr. J. J. Murray, as the first in a proposed series of sketches on "Some Virginia Ornithologists". This first one is followed in the May-June number by one on Percy Evans Freke, 1844-1931, by the same author. These sketches are informative and are worthy of preservation and bibliographic citation. We find also an interesting note on an instance of double payment of a bounty on hawks. A paper by Prof. Freer and numerous local notes are added. Much solid material is presented in this local periodical. In the July-August number (No. 7-8) Dr. Murray has a sketch of Harry Balch Bailey, as the third in the series.

Bird Calendar of the Cleveland Bird Club for January-March, 1936, is the repository for the Club's statistics. This Club keeps accurate records of the field work of its active members during each month. They know the number of trips, observers per trip, hours per trip, total mileage on foot per trip, hours in each type of habitat, etc. The tabulations are given quarterly in this *Calendar*. Large numbers of Whistling Swans were seen during March—as many as five hundred. A new method of census-taking is used in listing the winter birds by habitats. A list of 262 species is given for the Cleveland region. The issue for April-May gives a similar statistical summary for the second quarter of the year.

Mr. William I. Lyon has an instructive paper on bird banding as a hobby in the *Rotarian* for November, 1935.

The *Flicker* for May-December, 1935 (VII, Nos. 2-4) is devoted to an annotated list of 129 nesting species of birds for Minnesota. The issue for May, 1936 (VIII, No. 2) publishes lists of birds seen at Big Stone Lake in April and at Lake Traverse in September. Mr. Erickson reported a flock of 120 Whistling Swans near Minneapolis.

The TNA Annual for 1935 contains thirty-six pages of short papers on the natural history studies of the Toledo Naturalists' Association. In discussing the "Past and Present Status of the Bob-white in Ohio" Mr. Milton B. Trautman divides the history into three periods, viz., prior to 1840, 1840 to 1890, and 1890 to the present. He concludes that during the first period Ohio was forested and hence did not offer a habitat favorable for the Bob-white. During the second period the forests were cleared away, land was cultivated though not intensively, and the Bob-white came in and reached its peak. The third period is not so clearly presented, but apparently the author considers this a period of modern and intensive farming which has removed the cover so necessary for the protection of the Bob-white from its enemies and from the exigencies of the winter season. However, we are reminded of the paper by Dr. Kendeigh (Ohio Jr. Sci., XXXIII, Jan., 1933) which showed that during a period from 1914 to 1931 in Ohio, which probably marks the maximum of intensive farming, there was a steady increase in the estimated quail population. But, of course, during these years there was an annual closed season on the hunting of quail. So, perhaps intensive farming may not be the only, or even the main, factor of reduction. We hope that Ohio may continue to keep the Bob-white in the "song-bird list" indefinitely as an extensive experiment, if for no other reason.

The *Redstart* for February, 1936 (III, No. 5), gives some interesting observations by Charles Conrad on nest-building, both as to materials and methods of construction. In the May issue (III, No. 8) Mr. Merit B. Skaggs makes a comparison of some breeding birds in the Youngstown region. In the June number (III, No. 9) Mr. J. W. Handlan comments on the spring migration of 1936, and gives the first arrival dates for many species. Short notes are found in each issue.

The *Snowy Egret* (IX, No. 2) was issued for the summer of 1934, and is made up of seven bird lists—all for Michigan, except one list of breeding birds in Ohio by Dr. L. E. Hicks. The winter number for 1935 (X, No. 2) appears again in its new and attractive format. It is interesting to see how much can be done with the mimeograph process. In this issue blue print reproductions of photographs are included. We find an interesting article on the Pileated Woodpecker by O. M. Bryens; and a reprinting of notes on Indian bird lore, by the well known authority on Indian life, Dr. Melvin R. Gilmour. Various field notes covering a total of about fifty-six pages. Quarterly, $1.00 per year. H. A. Olsen, Pippapass, Ky.

Nature Notes for May (I, No. 5) features some common wild flowers in photographs. The June number gives five splendid photographs of successive stages in the life history of the common shaggy mane mushroom, and with the usual departmental offerings. The August number (II, No. 2) records the August nesting of a pair of Mourning Doves in Oceana County, Michigan.

In the *Cardinal* for July (1936, IV, No. 4) Mr. Bayard H. Christy gives some results of a study of the life and work of Jared Potter Kirtland, an early Ohio physician and naturalist. A great deal of Kirtland material was exhibited at the recent A. O. U. meeting at Pittsburgh as a result of Mr. Christy's activities in this direction. Mr. W. E. C. Todd reports on the chickadees of western Pennsylvania.

The *News Letter* of the Audubon Society of Missouri for May, 1936 (III, No. 5) gives an account of a two-day state field meet at some time during the spring, probably May. There is also a plea against the pole trap. In the June number cats are discussed and the question asked, "'Shall we license them to practice their code any more than we would license any human criminal?" In an article on "reconditioned nests" we are told how to make artificial eggs for such nests. From the August number (III, No. 7) we learn that the Missouri folks are working definitely to secure a list of the breeding birds of each county, or as many of the counties as have observers. Already twenty counties have reported lists.

The *Inland Bird Banding News* for June, 1936 (VIII, No. 2) gives a brief account of the work of banding Chimney Swifts at Beloit College. Mr. O. M. Bryens tells of his work in banding Redpolls in Michigan.

The June number of *Wildlife Review* (No. 4) contains the usual abstracts of literature under the heads of Conservation (5 abstracts); Control (2); Cycles (1); Disease (4); Ecology (6); Food Habits (7); Life History (5); Management (21); Propagation (8). There is also a continuation of the listing of periodicals (printed and mimeographed) which deal with various phases of wild life. In this issue are listed the periodicals dealing with ornithology, among others. The September number (No. 5) contains about ninety abstracts of papers classified under the same headings as given above. This mimeographed publication is issued by the United States Biological Survey.

The *St. Louis Bird Club Bulletin* for March-April, 1936 (V, No. 3) discusses "Methods of Attracting Birds" and the value of birds to mankind in comparison with other groups of vertebrates.

The *Chickadee* for December, 1935 (V, No. 2) presents a unique plan for establishing the rank of "Forbush Ornithologist" for those of its members who can meet a list of specifications. About twenty-three tests (listed in nine groups) are given which the candidate must pass in order to write "F. O." after his name. The tests are real, and anyone who passes them will be truly entitled to some distinction. As members qualify we would be glad to assist in making the announcement.

News from the Bird Banders for May, 1936 (XI, No. 2) lists a total of 39,347 individual birds, of 176 species, banded during 1935 in the ten states and provinces which comprise the region of the Western Bird-Banding Association. Numerically, the Pintail stands first on the list with 8,372; the Mallard is second, with 5,224; the Cedar Waxwing is third, with 5,150 individuals banded. There is also an interesting note on sterilizing weed seeds by heat when they are to be scattered as food for birds. The August number (XI, No. 3) gives a too brief account of an experiment in Arizona. Birds, chiefly Gambel's Sparrows, being trapped and banded in the spring months at Casa Grande Monument, were carried north and released at one-mile intervals. Fourteen of these were again trapped at the home station, showing that they had reversed the direction of their migratory flight for short distances.

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Mr. Samuel E. Perkins, III,
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In behalf of the officers of the Club the WILSON BULLETIN extends the greetings of the Season to all of its readers.